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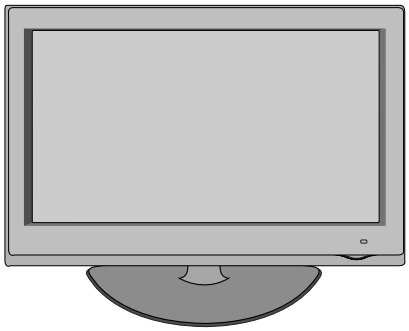
LCD TV
SERVICE MANUAL

CHASSIS : LA92B

MODEL : 55LH40/41 55LH40-UA/UE
55LH400C 55LH400C-UA

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL58436002 (0911-REV01)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

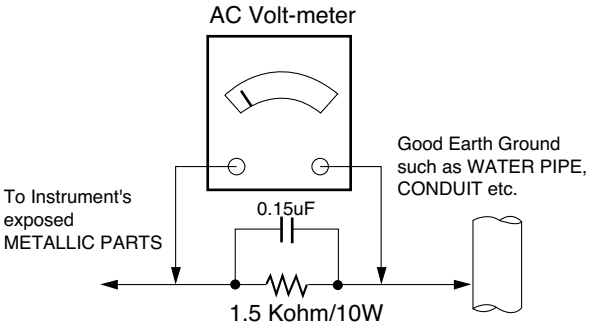
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1MΩ and 5.2MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard

SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the SAFETY PRECAUTIONS on page 3 of this publication.
NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.
   Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle.
   Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500°F to 600°F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500°F to 600°F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
   CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to the LCD TV used LA92B chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

1) Temperature : 25±5ºC (77±9ºF), CST : 40±5ºC
2) Relative Humidity : 65±10%
3) Power Voltage : Standard input voltage(100~240V@50/60Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety: UL, CSA, IEC specification, CE
   - EMC: FCC, ICES, IEC specification, CE

4. Electrical specification

4.1 General Specification

No	Item	Specification		Remark
1	Receiving System	ATSC/ NTSC-M		
2	Aspect Ratio	16:9		
3	LCD Module	LC470WUF-SBM1(Without Inverter)	FHD+Trumotion240Hz	47LH55-UA
		LC550WUD-SBA1(With Inverter)	FHD+120Hz	55LH40-UA
		LC550WUD-SBM1(With Inverter)	FHD+Trumotion240Hz	55LH55-UA
4	Available Channel	1) VHF : 02 ~ 13		
		2) UHF : 14 ~ 69		
		3) DTV : 02 ~ 69		
		4) CATV : 01 ~135		
		5) CADTV : 01 ~ 135		
5	Operating Environment	Temp.:0 ~ 40 deg		
		Humidity : ~ 80 %		
6	Storage Environment	Temp.:-20 ~ 60 deg		
		Humidity : ~ 85 %		
7	Input Voltage	AC100 ~240V,50/60Hz		
8	Tuning system	FS		

4.2 EyeQ-Green Motion Characters.

Ambient Illumination	Calculative Sensor Illumination	Backlight UI	Contrast	Brightness	Sharpness	Color
500	300	100	100	50	70	70
300	180	55	90	50	62	50
200	120	25	90	50	58	54
50	42	0	90	50	52	65

5 Safety and Regulation

No	Item		Min	Typ	Max	Unit		Remark
1.	Force Stability –Incline Plane Tip Test		10			deg		IEC60065
2.	Force Stability –Level Tip Test		weigthx0.13x9.8			N		
3.	Isolation Gap,AC-AC		3			mm		
4.	Isolation Gap,AC-DC		3			mm		
5.	Isolation Gap,Primary <-> GND		3			mm		
	Isolation Gap,Primary <-> Secondary		6.0			mm		
6.	Power Consumption,Max (1/8W non-clipped max.audio signal &Input voltage 110Vac/60HZ(North America) International VideoSignal)				280W			47LH55-UA
					360W			55LH40/55-UA
7.	Power Consumption,Stand by (Input voltage110Vac/60HZ(North America)			0.5	1W			(ST-BY power saving circuit)
8.	Power Consumption,Switch off				0.02 W			
9.	Energy	Saving Off		100		%		<Test Condition>
		Minimum	70	75	80	%		Full white pattern
		Medium	48	53	58	%		
		Maximum	22	27	32	%		
		Screen Off		15		%		
10.	OPC Black luminance difference of OPC on/off mode		54	60	66	%	150 Gray Input -white No Luminance difference	<Test Condition> Vivid mode,4% window white pattern *255 Gray Input Case:white/black No Luminance difference
11.	Dielectric Voltage	GND	1500 V/min at 100mA				1.5KV	IEC60065
		SIGNAL	3000 V/min at 100mA				3KV	
12.	Isolation Resistance		4		∞	MΩ		
13.	Leakage Current			0.35		mA rms		
14.	UL Compliance	Safety	UL1492					
		EMC	FCC Class B					
15.	CSA Compliance	Safety	CSA C22.2.					
		EMC	IC Class B					

6. DIGITAL Part

No	Item	Standard	Unit	Remark
1.	VSB Receiving	CH.2 ~69CH 1 ~135CH(CATV) 1 ~135CH(CADTV))		
2.	Video Resolution	ATSC 18 FORMAT		
3.	Audio Bit Resolution	32,40,48,56,64,80,96,112,128,160, 192,224,256,320,384,448,512,576,640	Kbps	
4.	VSB RF Input	75Ω unbalanced, F type Connector input		
5.	Sync Stable Time	Under 3.0	<None>SEC	

7. Chroma& Brightness

7.1 Module optical specification

No.	Item	Specification		Min.	Typ.	Max.	Remark
1.	Max Luminance (Center1-point/ Ful white pattern)	Modele		400	500		cd/m^2
2.	Luminance uniformity	Luminance		77			
3.	Contrast Ratio			1000: 1 40000: 1(DCR)	1400: 1 50000:1(DCR)		55LH40/55-UA
4.	Color Coordinates	White	WX	Typ -0.03	0.279	Typ +0.03	55LH40-UA
			WY		0.292		
		RED	Xr		0.637		
			Yr		0.333		
		Green	Xg		0.287		
			Yg		0.605		
		Blue	Xb		0.145		
			Yb		0.064		
5.	Color Temperatue	Cool		Typ -0.015	0.276	Typ +0.015	85% Full white pattern
					0.283		**The W/B Tolerance is
		Medium			0.285		± 0.015 for Adjustment
					0.293		Dynamic contrast :off
		Warm			0.313		Dynamic color :off
					0.329		Energy saving mode :off
6.	Color Distortion, DG					10.0	%
7.	Color Distortion,DP					10.0	deg
8.	Color S/N,AM/FM			43.0			dB
9.	Color Killer Sensitivity			-80			dB

7.2Max Luminance &Contrast measure standard specification

- Max Luminance measure specification

1) In non-impressed condition, measure peak brightness displayable as much as possible LCD module.
2) Measuring instrument: CA-210 or a sort of Color Analyzer.
3) Pattern Generator :VG- 828 or a sort of digital pattern generator (displayable Full White &1/25 White Window pattern)
4) Measure condition

• Test pattern: in center,1/5(H)*1/5(V) of Window Pattern (white pattern in non-impressed condition)
• SET condition: Contrast &Brightness Level 100%
• Environment condition : Dark room in the non outside light
• Video menu option condition

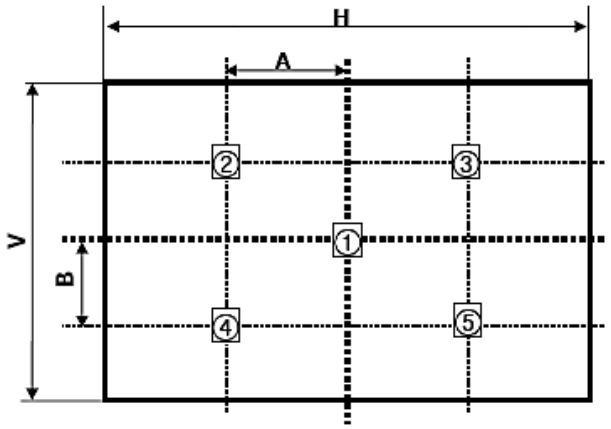
	Signal	Picture Mode	Dynamic Contrast	Dynamic Color	Black Level	OPC
RF	NTSC-M	Vivid	High	High	Low	Off
AV	NTSC-J	Vivid	High	High	High	Off
Component	720P	Vivid	High	High	High	Off
RGB	1024x768	Vivid	High	NA	NA	Off
HDMI	DTV 720P	Vivid	High	High	Low	Off

5) Measurement

• Do heat-run LCD module at 30minutes in normal temperature (25°C)by using full white pattern of 15%signal level(38 gray level).
• Impress test pattern signal in 1/5(H)*1/5(V)White Window of 100%(255Gray Level)
• measure 3 times brightness of central white window,and mark peak brightness in max brightness degree
• measure the same condition in video signal /RGB signal.

- Luminance uniformity measure specification

1) Impress 100%(255Gray Level) full white pattern at the same peak brightness measurement.
2) Measure average brightness in 5 points.



A: H/ 4mm
B: V/ 4mm
@ H,V: Active Area

- Contrast ratio measure specification

1) Test display signal :30*30 dots White Window signal &all Black Raster signal
2) Dark room measure condition: Using touch type Color analyzer CA-210 Dark room in the non outside light
3) Bright room measure condition: In bright room of 150Lx illumination in the panel surface, locate a source of light on the above 45° of the panel surface.
4) Measure method

• In standard test condition,impress 30*30 dots White Window Pattern signal .
Measure center peak brightness degree Lw of white window
• Impress black Raster signal as contrast ratio measurement signal.
Measure black brightness degree Lb of PDP central
Calculate the following numerical formula.
Contrast ratio =Lw /Lb

If it does not use Prior measurement, use generally simple test measurement. The Correct measure specification is followed by IEC61988-2/CD,JAPAN EIAJ-2710

8. Component Video Input (Y, C_B/P_B, C_R/P_R)

No	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)	
1.	720*480	15.73	60	13.5135	SDTV ,DVD 480I
2.	720*480	15.73	59.94	13.5	SDTV ,DVD 480I
3.	720*480	31.47	60	27.027	SDTV 480P
4.	720*480	31.47	59.94	27.0	DTV 480P
5.	1280*720	45.00	60.00	74.25	HDTV 720P
6.	1280*720	44.96	59.94	74.176	HDTV 720P
7.	1920*1080	33.75	60.00	74.25	HDTV 1080I
8.	1920*1080	33.72	59.94	74.176	HDTV 1080I
9.	1920*1080	67.500	60	148.50	HDTV 1080P
10.	1920*1080	67.432	59.939	148.352	HDTV 1080P
11.	1920*1080	27.000	24.000	74.25	HDTV 1080P
12.	1920*1080	26.97	23.94	74.176	HDTV 1080P
13.	1920*1080	33.75	30.000	74.25	HDTV 1080P
14.	1920*1080	33.71	29.97	74.176	HDTV 1080P

9. RGB

9.1 PC INPUT

No	Specification				Remark	
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)		DDC
1.	640*350	31.468	70.09	25.17	EGA	X
2.	720*400	31.469	70.08	28.32	DOS	O
3.	640*480	31.469	59.94	25.17	VESA(VGA)	O
4.	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5.	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6.	1280*768	47.776	59.870	79.5	CVT(WXGA)	X
7.	1360*768	47.712	60.015	85.50	VESA (WXGA)	X
8.	1366*768	47.13	59.65	72	VESA(WXGA)	X
9.	1280*1024	63.981	60.020	108.00	VESA (SXGA)	O
10.	1600*1200	75.00	60.00	162	VESA (UXGA)	O
11.	1920*1080	66.587	59.934	148.5	HDTV 1080P	O

10. HDMI Input (PC/DTV)

10.1 PC Mode

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1	640*350	31.468	70.09	25.17	EGA	
2	720*400	31.469	70.08	28.32	DOS	
3	640*480	31.469	59.94	25.17	VESA(VGA)	
4	800*600	37.879	60.31	40.00	VESA(SVGA)	
5	1024*768	48.363	60.00	65.00	VESA(XGA)	
6	1280*768	47.776	59.870	79.5	CVT(WXGA)	
7	1360*768	47.712	60.015	85.50	VESA (WXGA)	
8	1280*1024	63.981	60.020	108.00	VESA (SXGA)	
9	1600*1200	75.00	60.00	162	VESA (UXGA)	
10	1920*1080	7.5	60	148.5	HDTV 1080P	

10.2 DTV Mode

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1	720*480	31.47	60	27.027	SDTV 480P	
2	720*480	31.47	59.94	27.00	SDTV 480P	
3	1280*720	45.00	60.00	74.25	HDTV 720P	
4	1280*720	44.96	59.94	74.176	HDTV 720P	
5	1920*1080	33.75	60.00	74.25	HDTV 1080I	
6	1920*1080	33.72	59.94	74.176	HDTV 1080I	
7	1920*1080	67.500	60	148.50	HDTV 1080P	
8	1920*1080	67.432	59.939	148.352	HDTV 1080P	
9	1920*1080	27.000	24.000	74.25	HDTV 1080P	
10	1920*1080	26.97	23.94	74.176	HDTV 1080P	
11	1920*1080	33.75	30.000	74.25	HDTV 1080P	
12	1920*1080	33.71	29.97	74.176	HDTV 1080P	

11. EDID(The Extended Display Identification Data) / DDC(Display Data Channel) download

11.1 Overview

It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of “Plug and Play”. Equpment

11.2 Equipment

• Adj. R/C

• Since embedded EDID data is used, EDID download jig, HDMI cable and D-sub cable are not need.

11.3 Download method

Press Adj. key On the Adj. R/C, press Adj. key then select EDID D/L. By pressing Enter key, EDID download will begin.

1) If Download is successful, OK is displayed.
2) If Download is a failure, NG is displayed.
3) Re-try download.

11.4 EDID Data

• Reference: Download is only possible in POWER ON MODE.

• RGB [C/S: 36FF]

EDID Block 0, Bytes 0-127 [00H-7FH]

Block Type: EDID 1.3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	02	00	01	01	01	01
10	01	13	01	03	68	73	41	78	0A	CF	74	A3	57	4C	B0	23
20	09	48	4C	A1	08	00	A9	40	81	80	61	40	45	40	31	40
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	7E	8A	42	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	7E	8A	42	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	00	36

• HDMI I [C/S: 1BCA]

EDID Block 0, Bytes 0-127 [00H-7FH]

Block Type: EDID 1.3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	02	00	01	01	01	01
10	03	13	01	03	80	73	41	78	0A	CF	74	A3	57	4C	B0	23
20	09	48	4C	A1	08	00	A9	40	81	80	61	40	45	40	31	40
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	7E	8A	42	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	7E	8A	42	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	1B

EDID Block 1, Bytes 128-255 [80H-FFH]

Block Type: CEA EDID Timing Extension Version3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	1F	F1	47	90	22	20	05	04	03	02	26	15	07	50
10	09	07	07	67	03	0C	00	10	00	B8	2D	E3	05	03	01	02
20	3A	80	18	71	38	2D	40	58	2C	04	05	7E	8A	42	00	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	7E	8A	42
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	7E
50	8A	42	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96
60	00	7E	8A	42	00	00	18	26	36	80	A0	70	38	1F	40	30
70	20	25	00	7E	8A	42	00	00	1A	00	00	00	00	00	00	9A

• HDMI II [C/S: 1BBA]

EDID Block 0, Bytes 0-127 [00H-7FH]

Block Type: EDID 1.3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	02	00	01	01	01	01
10	03	13	01	03	80	73	41	78	0A	CF	74	A3	57	4C	B0	23
20	09	48	4C	A1	08	00	A9	40	81	80	61	40	45	40	31	40
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	7E	8A	42	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	7E	8A	42	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	1B

EDID Block 1, Bytes 128-255 [80H-FFH]

Block Type: CEA EDID Timing Extension Version3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	1F	F1	47	90	22	20	05	04	03	02	26	15	07	50
10	09	07	07	67	03	0C	00	10	00	B8	2D	E3	05	03	01	02
20	3A	80	18	71	38	2D	40	58	2C	04	05	7E	8A	42	00	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	7E	8A	42
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	7E
50	8A	42	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96
60	00	7E	8A	42	00	00	18	26	36	80	A0	70	38	1F	40	30
70	20	25	00	7E	8A	42	00	00	1A	00	00	00	00	00	00	9A

• HDMI III [C/S: 1BAA]

EDID Block 0, Bytes 0-127 [00H-7FH]

Block Type: EDID 1.3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	02	00	01	01	01	01
10	03	13	01	03	80	73	41	78	0A	CF	74	A3	57	4C	B0	23
20	09	48	4C	A1	08	00	A9	40	81	80	61	40	45	40	31	40
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	7E	8A	42	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	7E	8A	42	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	1B

EDID Block 1, Bytes 128-255 [80H-FFH]

Block Type: CEA EDID Timing Extension Version3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	1F	F1	47	90	22	20	05	04	03	02	26	15	07	50
10	09	07	07	67	03	0C	00	30	00	B8	2D	E3	05	03	01	02
20	3A	80	18	71	38	2D	40	58	2C	04	05	7E	8A	42	00	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	7E	8A	42
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	7E
50	8A	42	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96
60	00	7E	8A	42	00	00	18	26	36	80	A0	70	38	1F	40	30
70	20	25	00	7E	8A	42	00	00	1A	00	00	00	00	00	00	9A

• HDMI IV [C/S: 8091]

EDID Block 0, Bytes 0-127 [00H-7FH]

Block Type: EDID 1.3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	02	00	01	01	01	01
10	03	13	01	03	80	73	41	78	0A	CF	74	A3	57	4C	B0	23
20	09	48	4C	A1	08	00	A9	40	81	80	61	40	45	40	31	40
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	7E	8A	42	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	7E	8A	42	00	00	1E	00	00	00	FD	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	1B

EDID Block 1, Bytes 128-255 [80H-FFH]

Block Type: CEA EDID Timing Extension Version3

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	1F	F1	47	90	22	20	05	04	03	02	26	15	07	50
10	09	07	07	67	03	0C	00	40	00	B8	2D	E3	05	03	01	02
20	3A	80	18	71	38	2D	40	58	2C	04	05	7E	8A	42	00	00
30	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00	7E	8A	42
40	00	00	9E	01	1D	00	72	51	D0	1E	20	6E	28	55	00	7E
50	8A	42	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	10	3E	96
60	00	7E	8A	42	00	00	18	26	36	80	A0	70	38	1F	40	30
70	20	25	00	7E	8A	42	00	00	1A	00	00	00	00	00	00	9A

12. Power

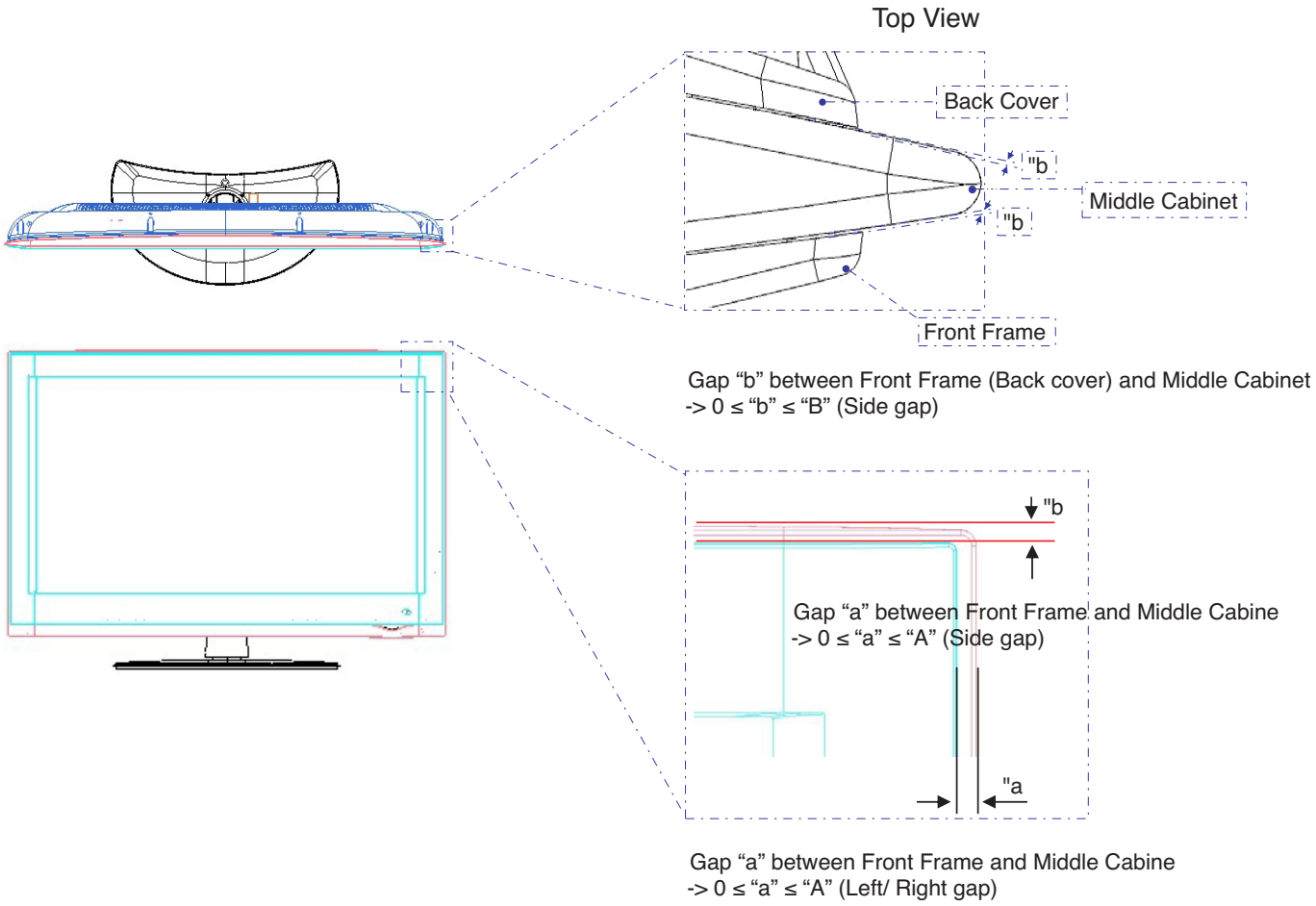
No	Item			Min	Typ	Max	Unit	Remark
1.	Power On/Off			10000			times	
2.	DC Voltage	Inverter Voltage		21.6	24	26.4	V	
		Logic Voltage(Vcc)		4.8	5	5.3	V	
		Sound Amp Vcc		19	20	22	V	Lips 20
				22	24	26	V	PSU 24V
		Micom B+		3.25	3.4	3.55	V	
		Tuner 5V		4.75	5.0	5.25	V	
		VSC Vcc	24V	22.0	24.0	26.0	V	PSU 24V
			20V	19.0	20.0	21.0	V	Lips 20
			12V	11.0	12.0	13.0	V	
			5V	4.5	5.0	5.5	V	Inside Temp.Under 20deg.
			No operation	0	0.5	1	V	
3.	AC Power Shut Down Voltage			90		264	V	Wide Range PSU

13. Mechanical specification

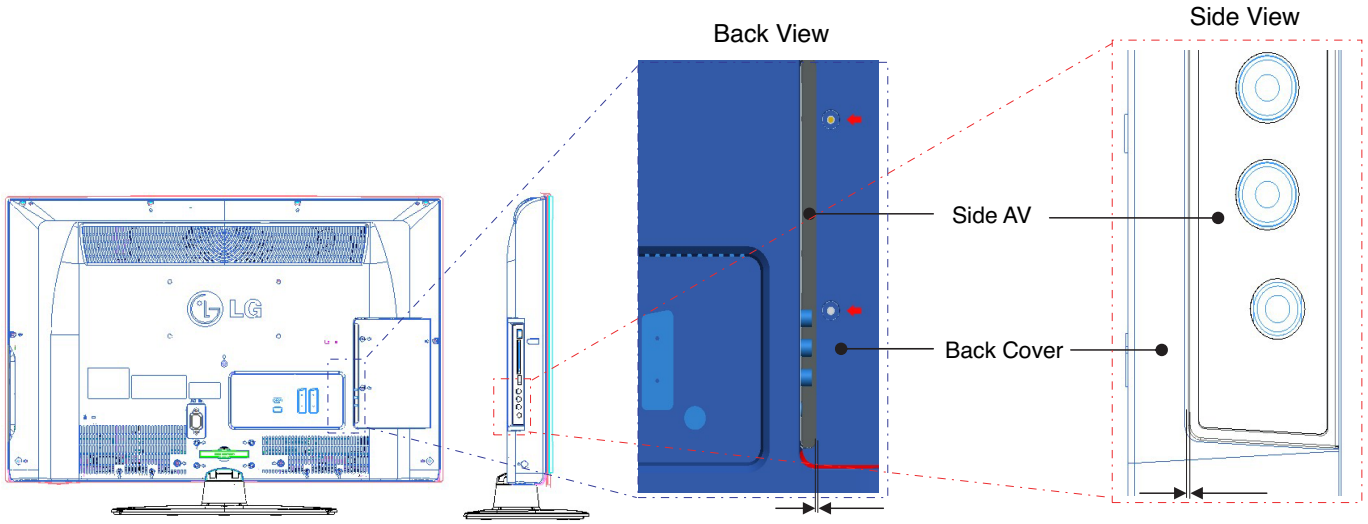
* Refer to Minerva Gap SPEC.

inch	32		37		42		47		55	
	top	side	top	side	top	side	top	side	top	side
A	Δ0.8	Δ1.0	Δ0.8	Δ1.2	Δ1.0	Δ1.5	Δ1.0	Δ1.5	Δ1.0	Δ1.7
B	0.7		0.7		0.7		0.7		0.7	
C	0.7		0.7		0.7		0.7		0.7	
D	Control Button -Back cover gap :0.8mm									
E	Side Bracket -Back cover around gap :1.0mm									
F	Display shift :IA-BI ≤ 2.0mm IC-DI≤ 2.0mm									

1) Gap between Front Frame /Back cover and Middle Cabinet
2) Gap between Front Frame /Middle Cabinet

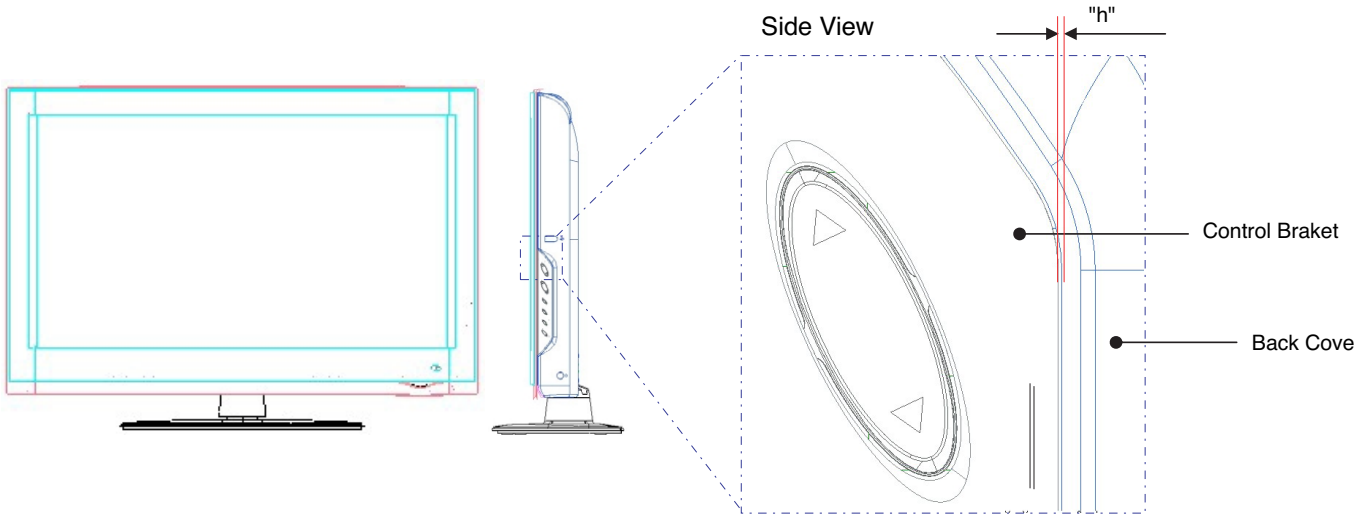


3) Gap between Back Cover and Side AV



Gap “f ” between Back Cover and Side AV
-> 0 ≤ “f ” ≤ 1.0
Gap “g” between Back Cover and Side AV
-> 0 ≤ “g” ≤ 1.0

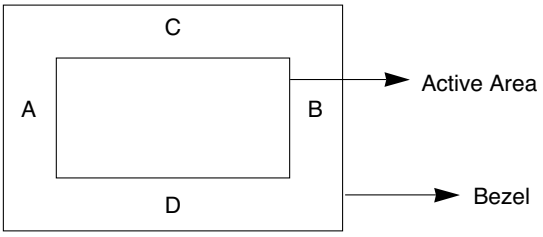
4)Gap between Back Cover and Side AV



Gap “h”between Back Cover and Control Bracket
-> 0 ≤ “h” ≤ 0.8

*Active area

1. Active area of LCD PANEL is in bezel of cabinet
2. Interval between active area and bezel
   IA-BI< 2.0 mm ,IC-DI< 2.0 mm
   A:Interval between left of active area and bezel
   B:Interval between right of active area and bezel
   C:Interval between top of active area and bezel
   D:Interval between bottom of active area and beze



ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LCD TV with LA92G chassis.

2. Specification

1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
2) Adjustment must be done in the correct order.
3) The adjustment must be performed in the circumstance of 25 ±5°C of temperature and 65±10% of relative humidity if there is no specific designation.
4) The input voltage of the receiver must keep 100~240V, 50/60Hz.
5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of 0°C, it should be placed in the circumstance of above 15°C for 2 hours.

In case of keeping module is in the circumstance of below -20°C, it should be placed in the circumstance of above 15°C for 3 hours,.

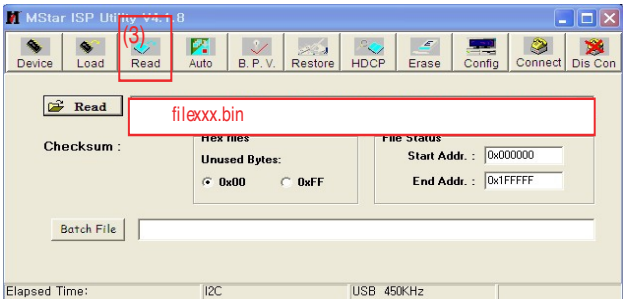
*Caution
When still image is displayed for a period of 20 minutes or longer (especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

3. Main PCB check process

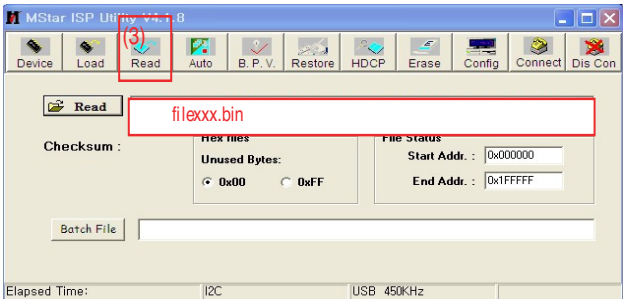
*APC - After Manual-Insert, executing APC

3.1 Boot file Download

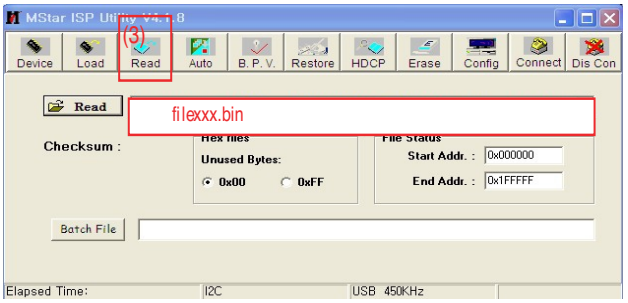
1. Execute ISP program “Mstar ISP Utility” and then click “Config” tab.
2. Set as below, and then click “Auto Detect” and check “OK” message. If “Error” is displayed, Check connection between computer, jig, and set.
3. Click “Read” tab, and then load download file (XXXX.bin) by clicking “Read”



4. Click “Connect” tab. If “Can’t ” is displayed, Check connection between computer, jig, and set.

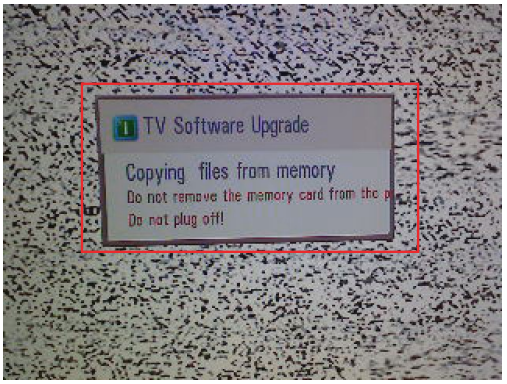


5. Click “Auto” tab and set as below.
6. Click “Run”.
7. After downloading, check “OK” message.

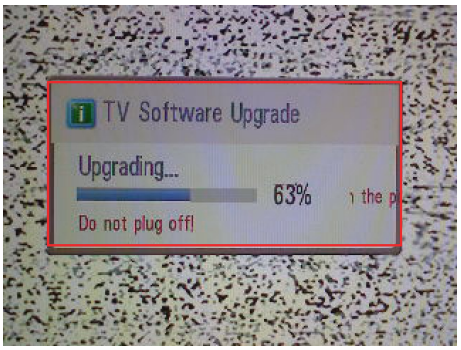


3.2 USB DOWNLOAD(*.epk file download)

1. Put the USB Stick to the USB socket
2. Automatically detecting update file in USB Stick
- If your downloaded program version in USB Stick is Low, it didn’t work. But your downloaded version is High, USB data is automatically detecting
3. Show the message “Copying files from memory”



4. Updating is staring.



5. Updating Completed, The TV will restart automatically.
6. If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)

* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust TOOL OPTION again.
1. Push "IN-START" key in service remote controller.
2. Select "Tool Option 1" and Push "OK" button.
3. Punch in the number. (Each model has their number.)
4. Completed selecting Tool option.

Model	Tool option1	Tool option2	Tool option3	Tool option4
47LH55-UA	33281	3400	35748	1024
55LH55-UA	45569	3400	35748	1024
55LH40-UA	45313	3400	35748	1024

4. Board-level adjustment

4.1 Board-level adjustment

• Adjust 480i Comp1 adj.(Comp1080i & RGB Adjust use internal pattern).
• EDID/DDC download
Above adjustment items can be also performed in Final Assembly if needed. Both Board-level and Final assembly adjustment items can be check using In-Start Menu 1. Adjust Check.
* After Board level adjustment, set volume setting value 0

4.2 Final assembly adjustment

•White Balance adjustment
•RS-232C functionality check
•Factory Option setting per destination
•Ship-out mode setting (In-Stop)

4.3 Etc.

•Ship-out mode
•Service Option Default
•USB Download(S/W Update, Option)

5. Board-level adjustment

5.1 ADC adjustment

5.1.1 Overview
ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.
5.1.2 Equipment & Condition
1) Jig (RS-232C protocol)
2) Input : MSPG-925FS(Model : 209 ,Pattern : 65, Only component))
3) RGB Adjust use internal pattern.5.1.3 Adjustment
5.1.3 Adjustment
5.1.2.1 Method
• Using RS-232, adjust items listed in 3.1 in the order shown in 5.1.2.3 Adj. protocol

Protocol	Command	Set ack
Enter adj. mode	ad 00 00	d 00 OK00x
Begin adj.	ad 00 10	
Return adj.		OKx (Success)
result		NGx (Fail)
Read adj. data	(main) ad 00 20 (sub) ad 00 21	(main) 00000000000000000000000007c007b006dx (Sub) 00000007000000000000000007c00830077x
Confirm adj.	ad 00 99	NG 03 00x (Fail) NG 03 01x (Fail) NG 03 02x (Fail) OK 03 03x (Success)
End adj.	ad 00 90	d 00 OK90x

Ref.) ADC adj. RS232C Protocol_Ver1.0
5.1.2.3 Adj. order
•ad 00 00 [Enter ADC adj. mode]
•ad 00 10 [Adjust 480i Comp1/1080i Comp1/1024*768 RGB]
•ad 00 90 End adj.

6. Final Assembly adjustment

6.1 White Balance adjstment

6.1.1 Overview

•W/B adj.: Objective & How-it-works

- Objective: To reduce each Panel's W/B deviation
- How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.

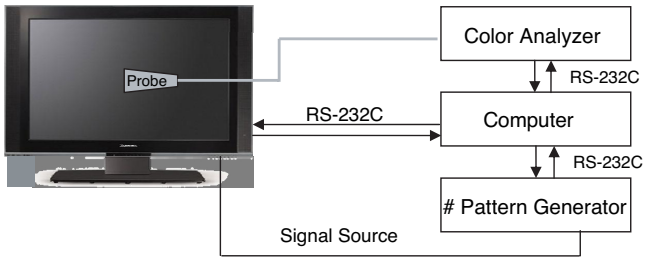
6.1.2 Equipment

1) Color Analyzer : CA-210 (NCG: CH 9 / WCG: CH12 /LED Module:CH14)
2) Adjustment Computer (During auto adj., RS-232C protocol is needed)
3) Adjustment R/C
4) Video Signal Generator MSPG-925F 720p/216Gray (Model:217, Pattern:78)

-> Only when internal pattern is not available

• Color Analyzer Matrix should be calibrated using CS-1000

6.1.3 Equipment connection map



□* If TV internal pattern is used,not needed

• Protocol

<Command Format>

START	6E	A	50	A	LEN	A	03	A	CMD	A	00	A	VAL	A	CS	A	STOP

- LEN: Number of Data Byte to be send
- CMD: Command
- VAL: FOS Data
- CS: Checksum of sent Data
- A: Acknowledge

Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

• RS-232C Command used during auto-adjustment

CMD	ID	DATA	Explanation
wb	00	00	Begin White Balance adj.
wb	00	ff	End White Balance adj. (internal pattern disappears)

Ex) wb 00 00 -> Begin white balance auto-adj.
wb 00 10 -> Gain adj.
ja 00 ff -> Adj. data
jb 00 c0
...
...
wb 00 1f -> Gain adj. complete
*(wb 00 20(Start), wb 00 2f(End)) -> Off-set adjustment
wb 00 ff -> End white balance auto-adjustment

6.1.4 Adjustment method

6.1.4.1 Auto adjustment method

1) Set TV in adj. mode using POWER On Key
2) Zero calibrate probe then place it on the center of the Display
3) Connect Cable(RS-232C)
4) Select mode in adj. Program and begin adj.
5) When adj. is complete (OK Sign), check adj. status per mode (Warm, Medium, Cool)
6) Remove probe and RS-232C cable to complete adj.

• adj. must begin w/ command "Wb 00 00", and end w/"wb 00 ff" and adjustment offset if needed.

6.1.4.2 Manual adj. method

Dynamic contrast : off
Dynamic color : off
OPC : Off
Energy saving mode : Off

1) Set TV in adj. mode using POWER On Key
2) Press ADJ key Æ EZ adjust using adj. R/C
3) Using CH + / - KEY, select 7.TEST PATTERN then press Enter to place inHEAT RUN mode and wait for 5 minutes.
4) Zero calibrate the probe of Color Analyzer, then place iton the center of LCD module within 10 cm of the surface.
5) Press ADJ key Æ 6. White-Balance then press the cursor to the right (KEY▶)

(When▶ is pressed Full White internal pattern will be displayed)

6) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
7) Adjustment is performed in COOL, MEDIUM, WARM 3 modes of color temperature

• If internal pattern is not available, use RF input(Full white 216 gray) In EZ Adjustment menu 6.White Balance, you can select one of 2 options: Test pattern ON, Test pattern OFF. Default is "ON" By selecting "OFF", you can adjust using RF signal.

• Adjustment condition and cautionary items

1) Lighting condition in surrounding area Surrounding lighting should be lower than 10 lux.
Try to isolate adj. area into dark surrounding.
2) Probe location
- Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
- B/L on should be checked using no signal or Full white Pattern

6.1.5 Reference

(White Balance adj. coordinate and color temperature)

• Luminance: Full white 216 Gray
• Standard color coordinate and temperature using CS-1000

Mode	Coordinate		Temp	uvΔ
	x	y		
Cool	0.276	0.283	11000K	0.0000
Medium	0.285	0.293	9300K	0.0000
Warm	0.313	0.329	6500K	0.0000

• 55LH40-UA, 47/55LH55-UA (N-America)
Standard color coordinate and temperature using CA-210(CH 09)

Mode	Coordinate		Temp	uvΔ
	x	y		
Cool	0.276±0.002	0.283±0.002	11000K	0.0000
Medium	0.285±0.002	0.293±0.002	9300K	0.0000
Warm	0.313±0.002	0.329±0.002	6500K	0.0000

6.2 Option selection per country

6.2.1 Overview

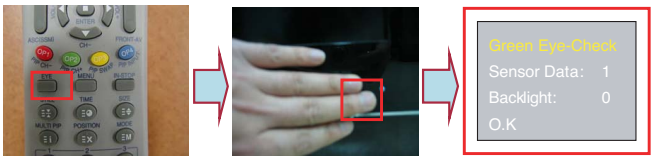
- Option selection is only done for models in Non-USA North America due to rating
- Applied model: LA92B Chassis applied None USA Model(Canada, Mexico)

6.2.2 Method

1) Press ADJ key on the Adjustment R/C, then select Country Group Menu
2) Depending on destination, select KR or US, then on the lower option, select US, CA, MX. Selection is done using +, - KEY

6.3 EYE-Q function check

Step 1) Turn on TV
Step 2) Press EYE key of Adj. R/C
Step 3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds
Step 4) Confirm that R/G/B value is lower than 10 of the “Raw Data (R: G: B:)” .
If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor
Step 5) Remove your hand from the Eye Q II sensor and wait for 6 seconds
Step 6) Confirm that “B. Light(xxx)” value increases from 0.
If change is not seen, replace Eye Q II sensor



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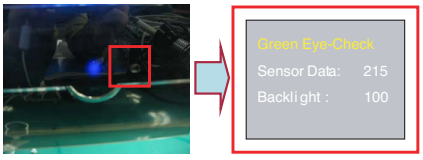


< step 5> < step 6>

7. GND and Internal Pressure check

7.1 Method

1) GND & Internal Pressure auto-check preparation
- Check that Power Cord is fully inserted to the set (If loose, re-insert)

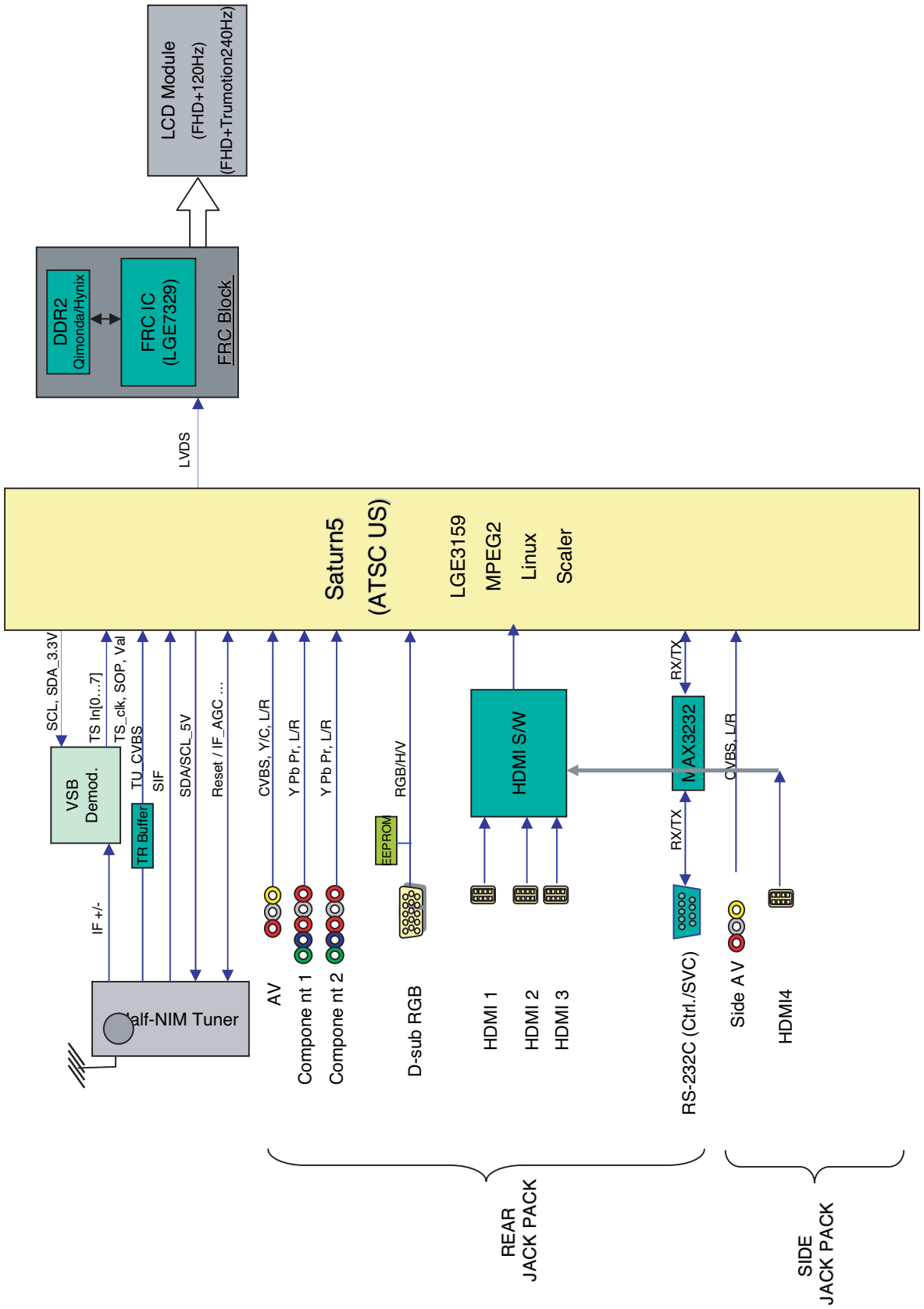
2) Perform GND & Internal Pressure auto-check
- Unit w/ fully inserted power cord and A/V arrives to the auto-check process.
- Connect D-terminal AV JACK TESTER
- Auto CONTROLLER(GWS103-4) ON
- Perform GND TEST
- If NG, Buzzer will sound to inform the operator
- If OK, changeover to I/P check automatically (Remove CORD,A/V from AV Jack Box)
- Perform I/P test
- If NG, Buzzer will sound to inform the operator
- If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

7.2 Checkpoint

- TEST voltage
- GND: 1.5KV/min at 100mA
- Signal: 3KV/min at 100mA
- Test time: 1 second
- Test point
- GND test = Power cord GND & signal cable metal GND
- Internal pressure TEST = POWER CORD GND & LIVE & NEUTRAL
- LEAKAGE CURRENT: At 0.5mArms

VIDEO TROUBLESHOOTING

• VIDEO PATH



1. Side effect of OPC Function

A change of Brightness or OSD Flicker problem

YES

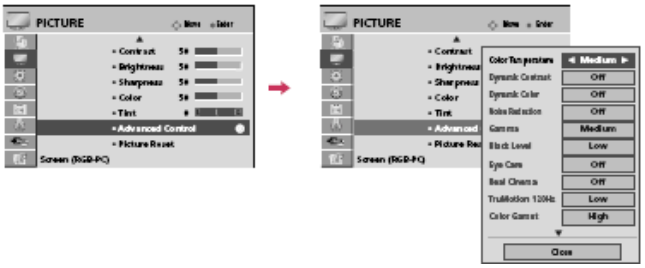
Check OPC Status in the picture-Advanced Control menu

YES

Recheck After OPC Off

YES

This problem is side effect of OPC Function
1)A change of Brightness means Backlight dimming is operating by dark image because of OPC function
2)A phenomenon of flicker a specially bright areais Side effect because of OPC function



Ex1) A change of total brightness adding local bright image or caption

<In excluding a caption>

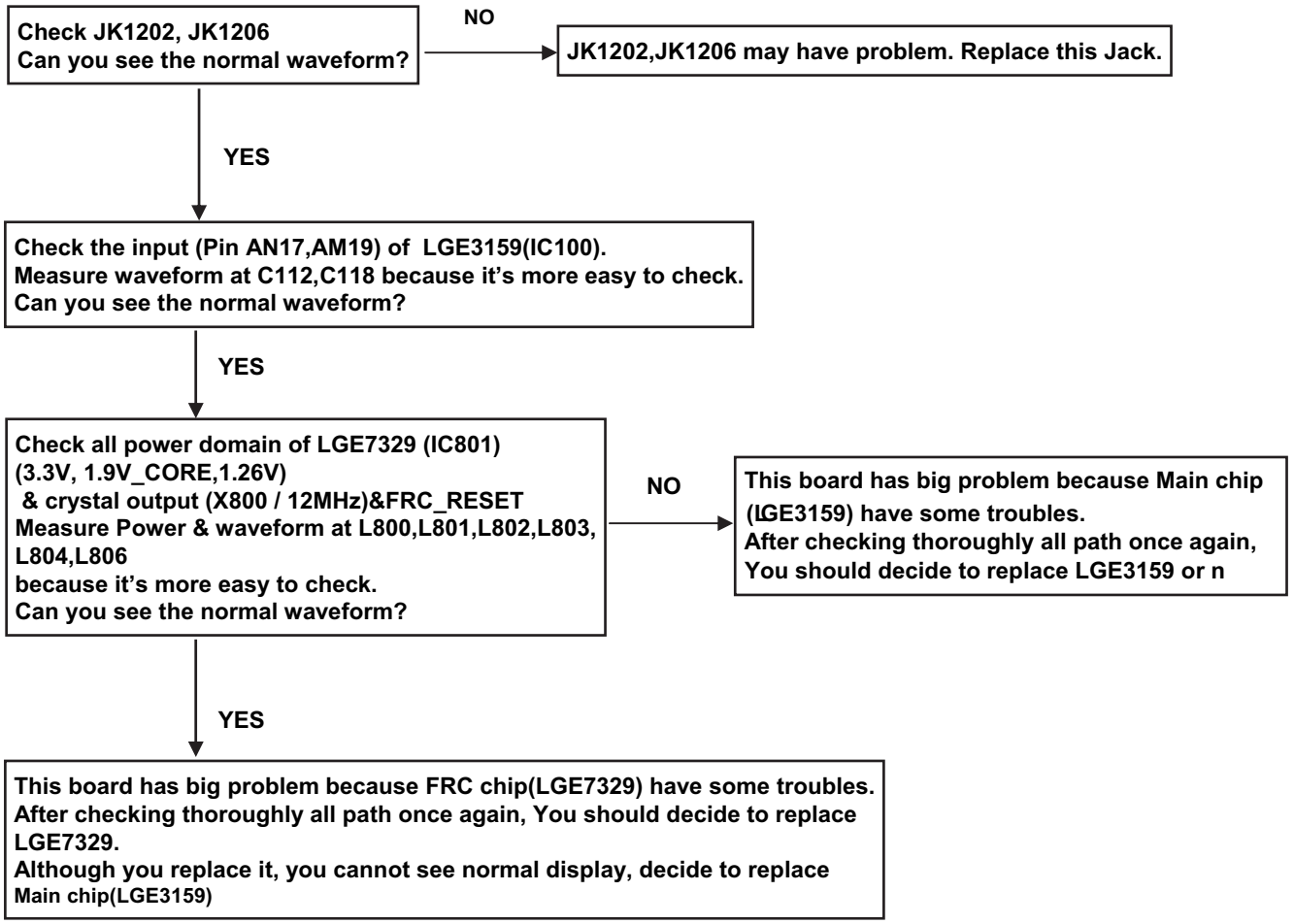
< In including a caption >

Ex2) A phenomenon of moment flicker a specially bright area after changing channel or input mode

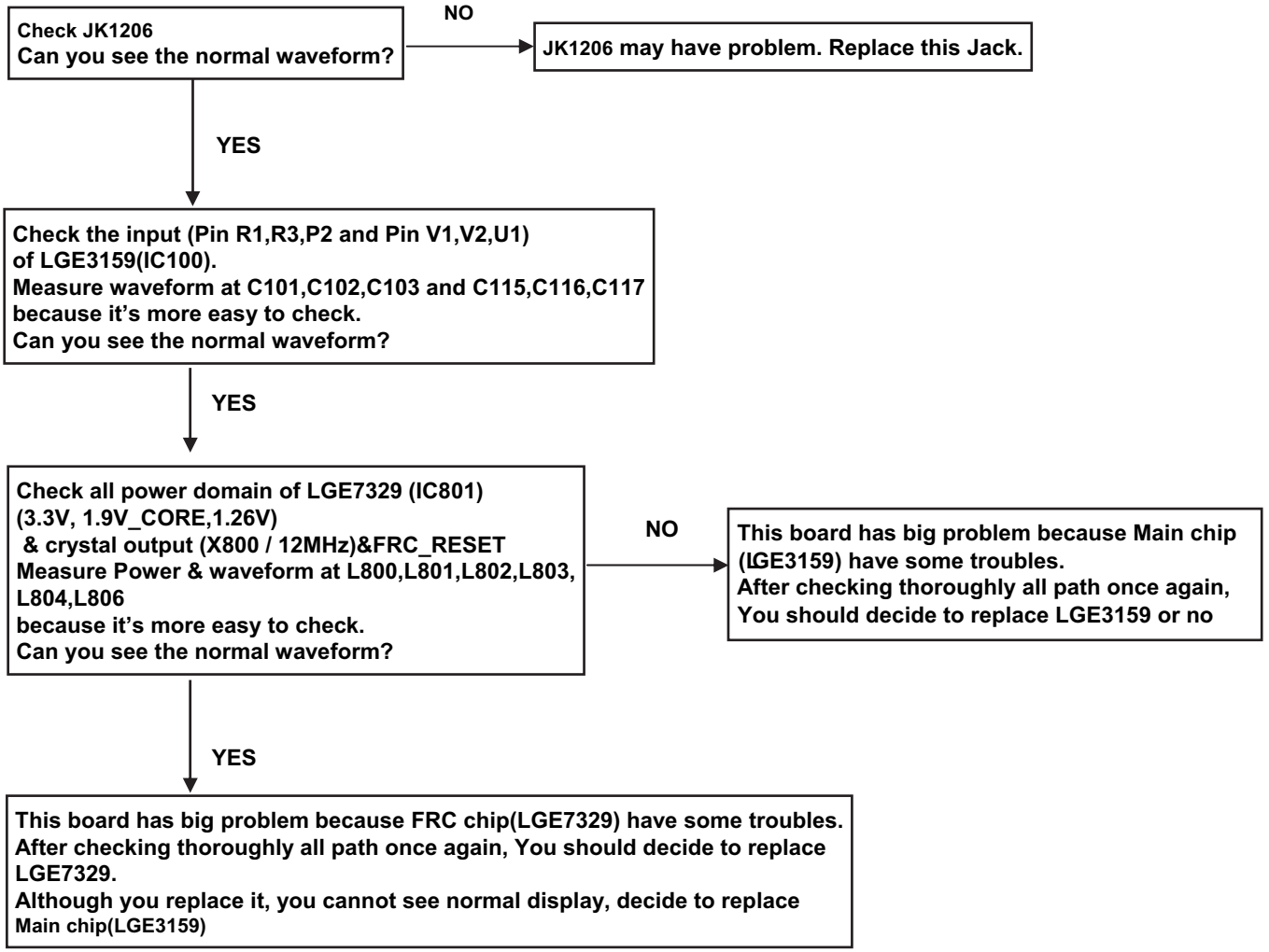
<Before changing channel>

<After changing channel>

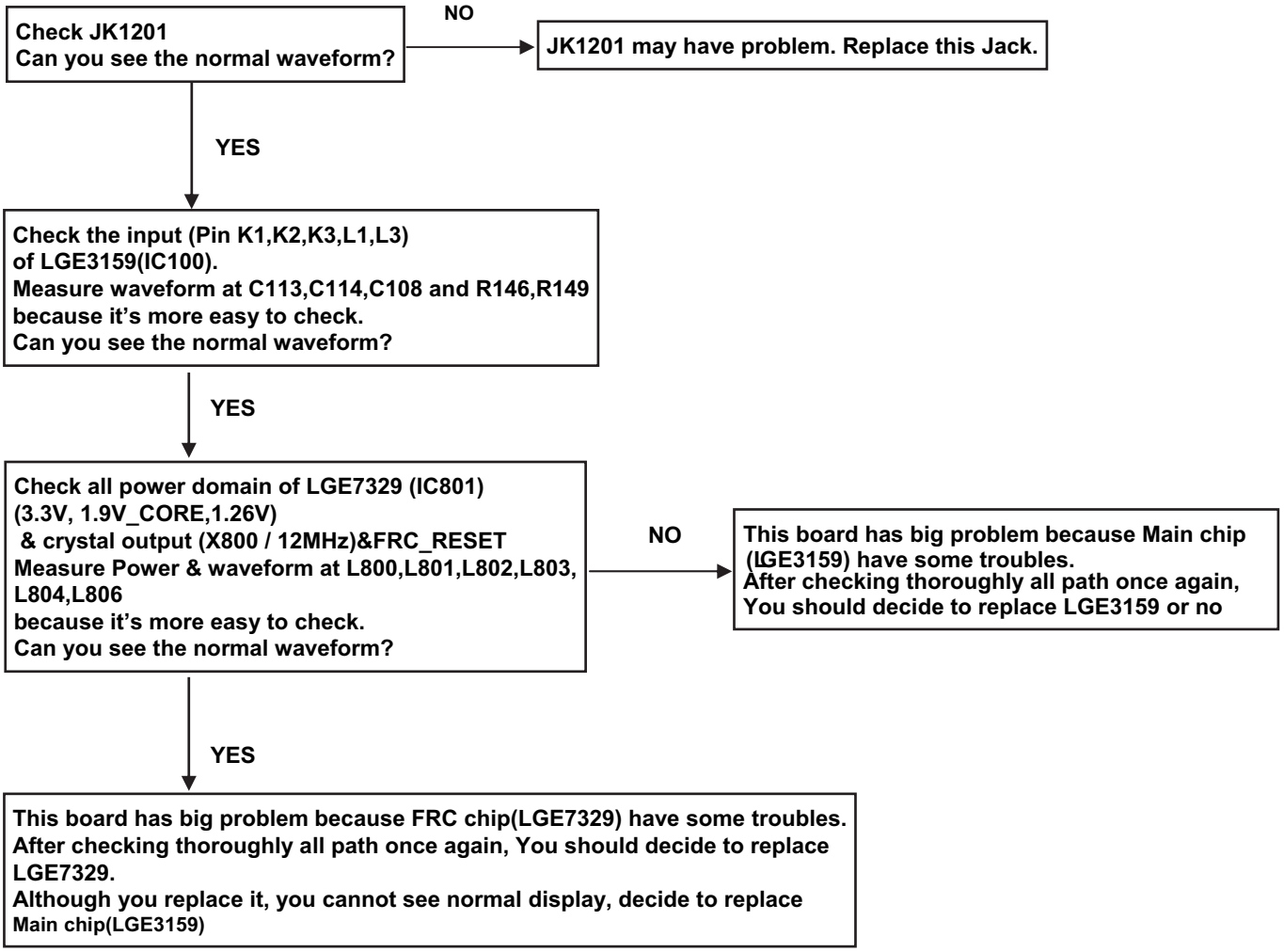
2. AV



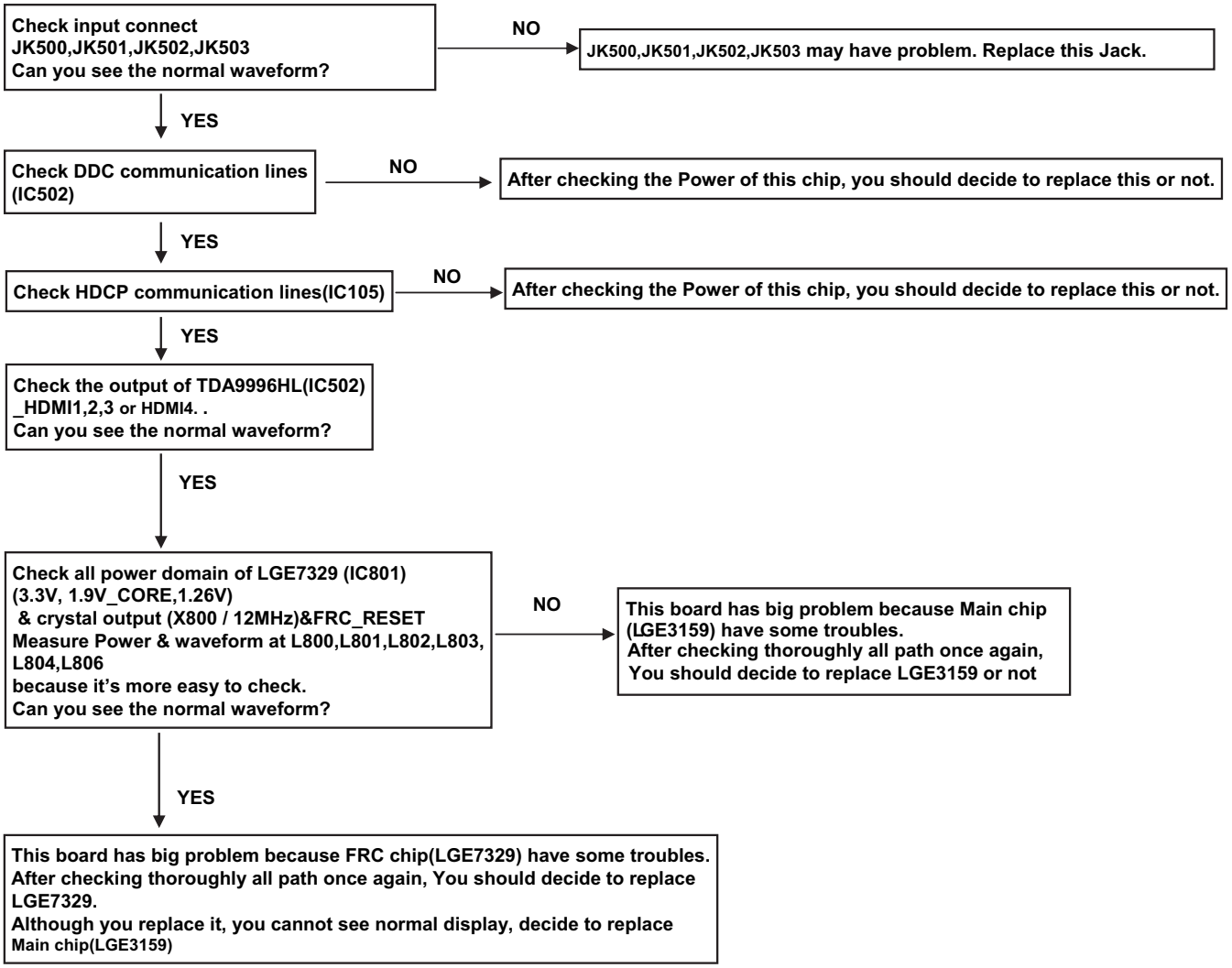
3. Component



4. RGB PC

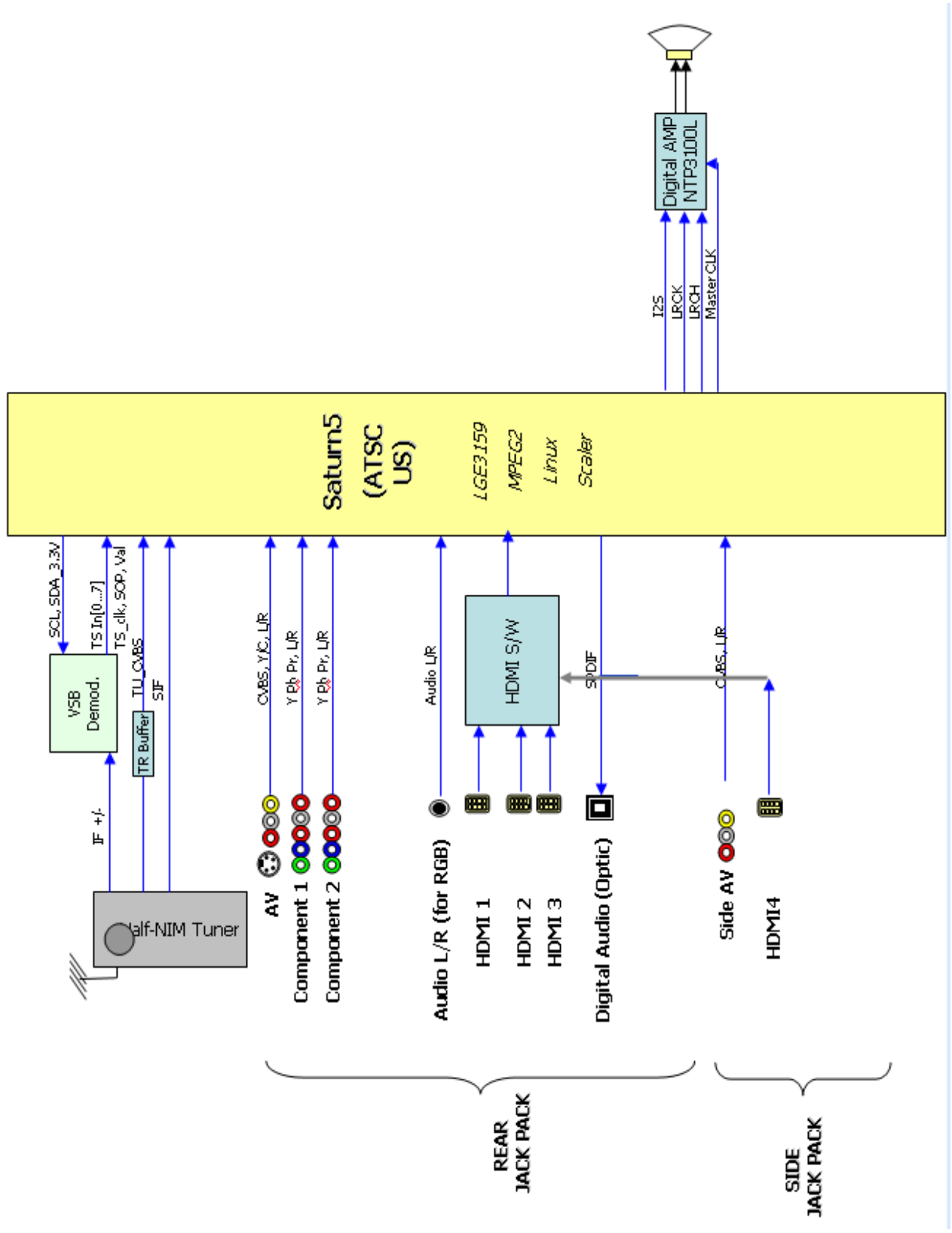


5. HDMI

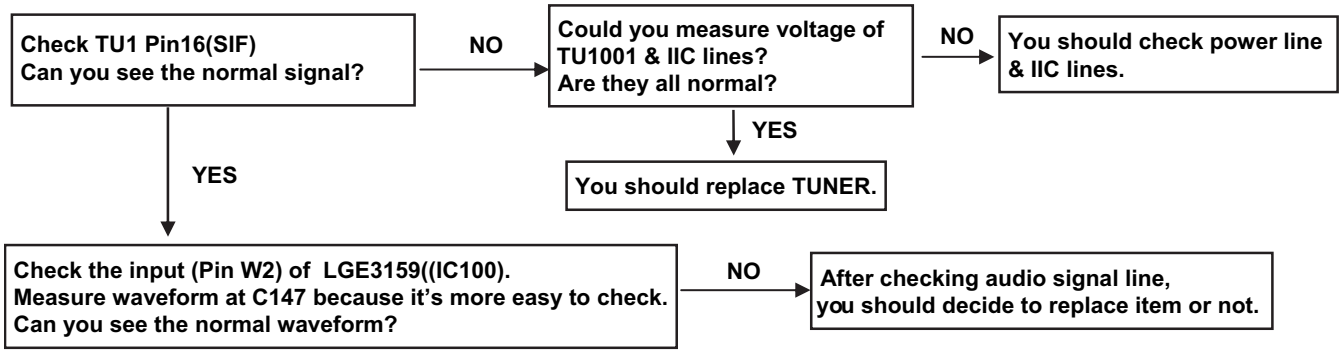


AUDIO TROUBLESHOOTING

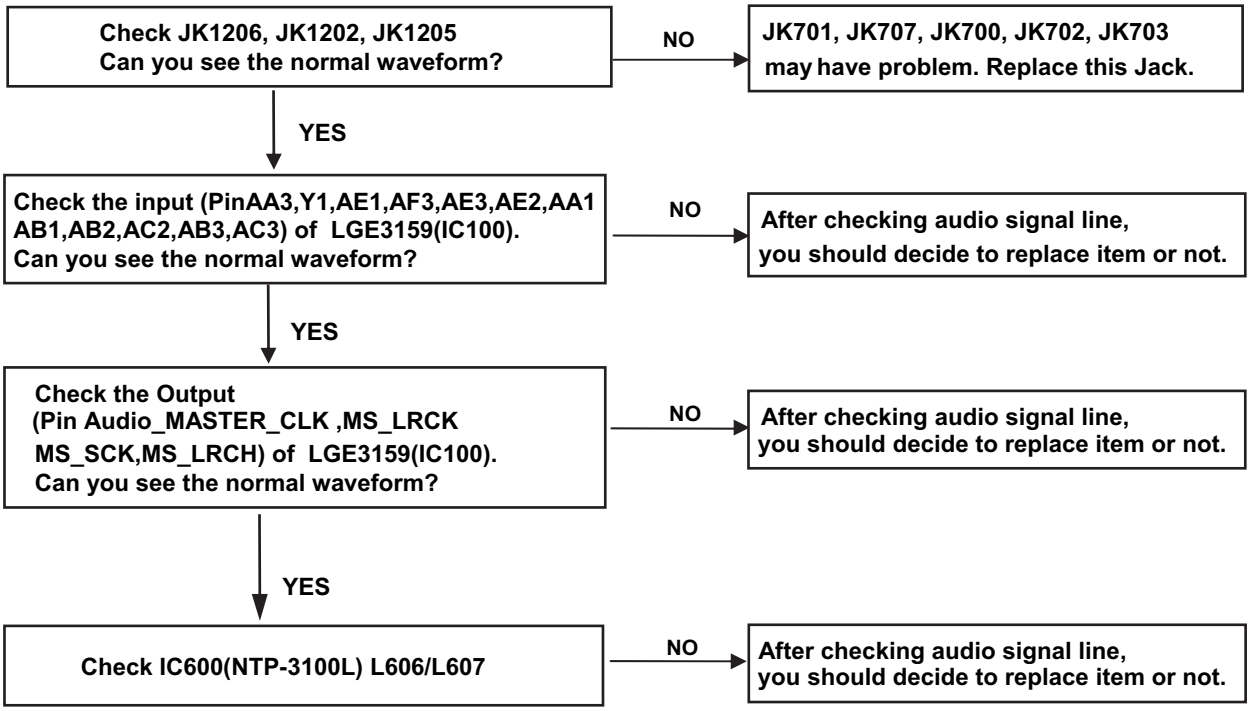
• AUDIO PATH

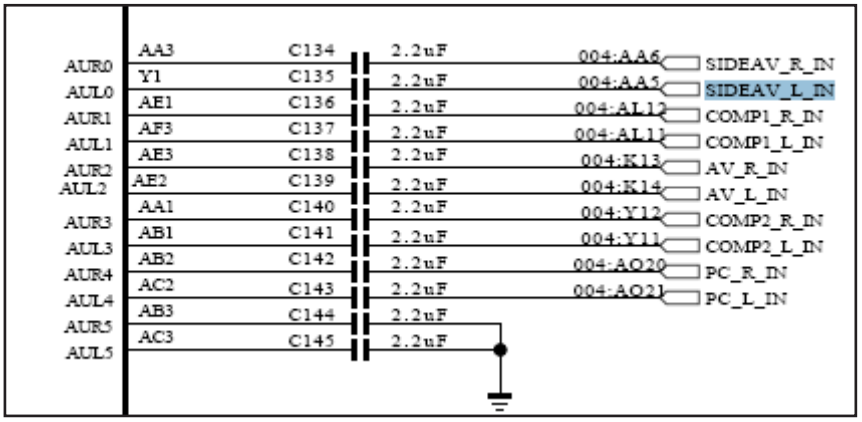


1. TV/ CATV

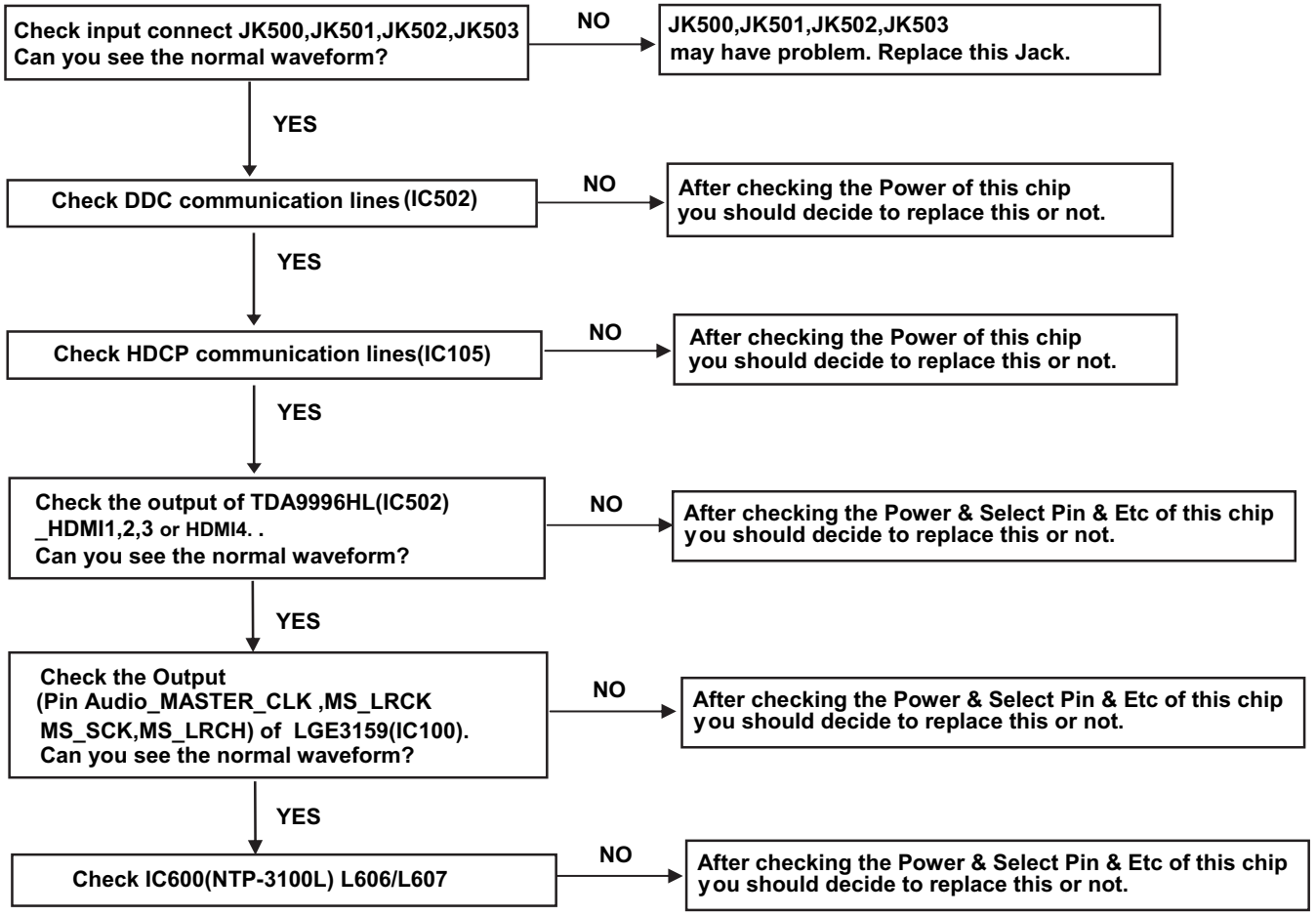


2. AV/ Component/ RGB- PC

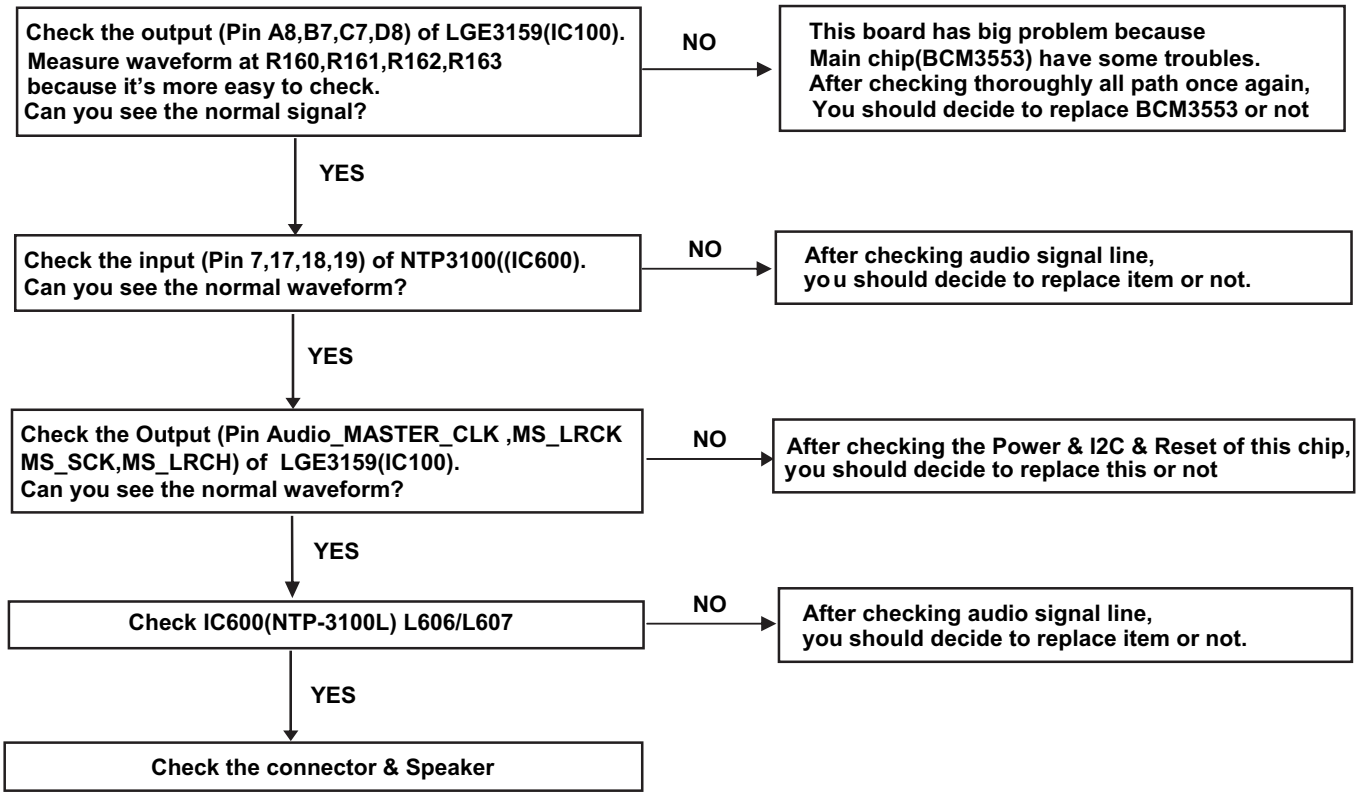


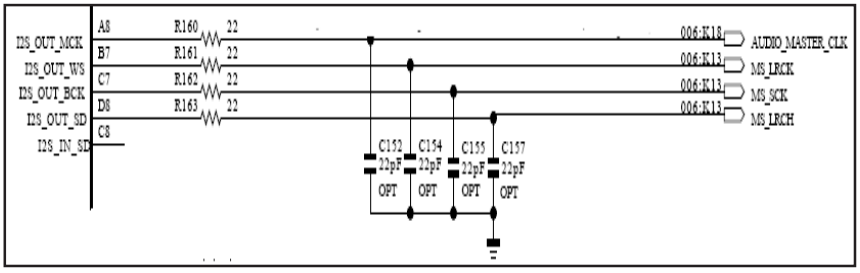


3. HDMI

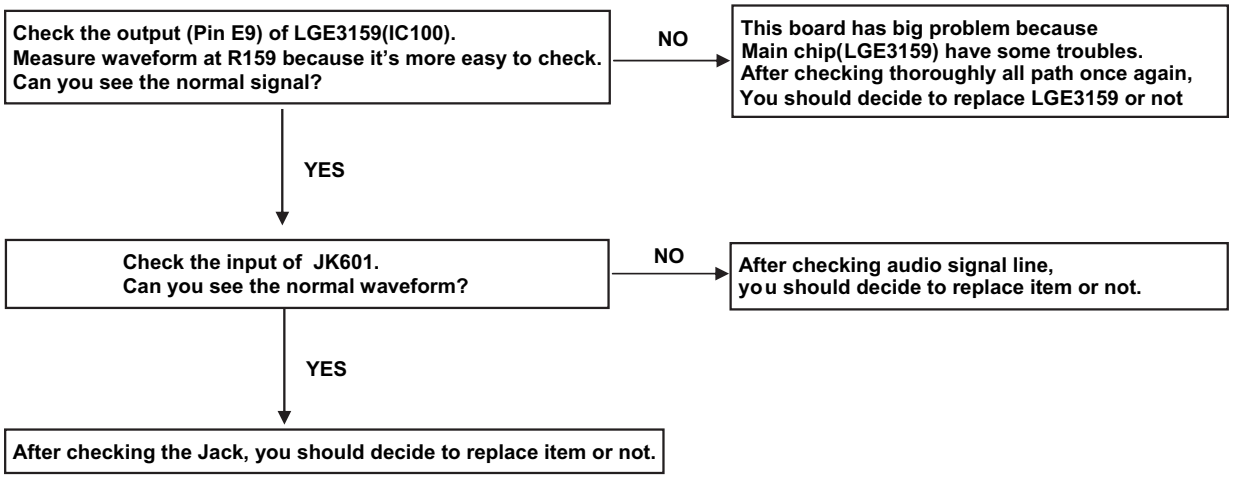


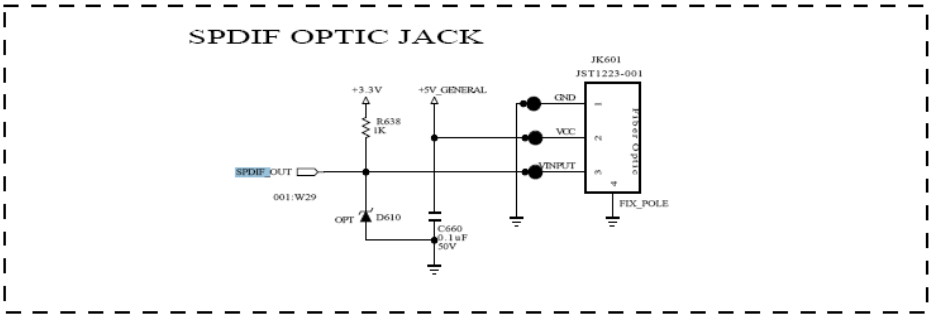
4. Speaker



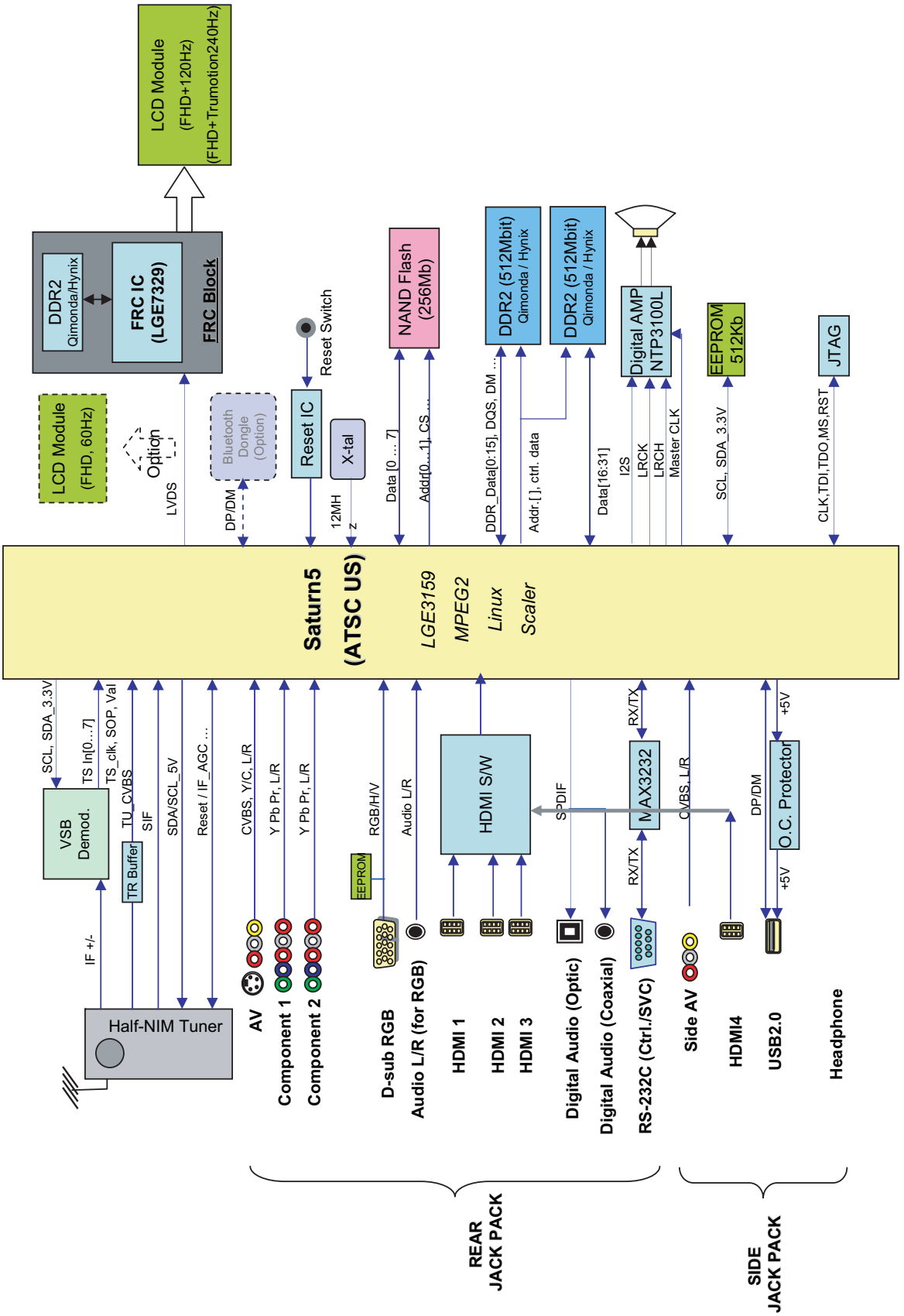


5. SPDIF

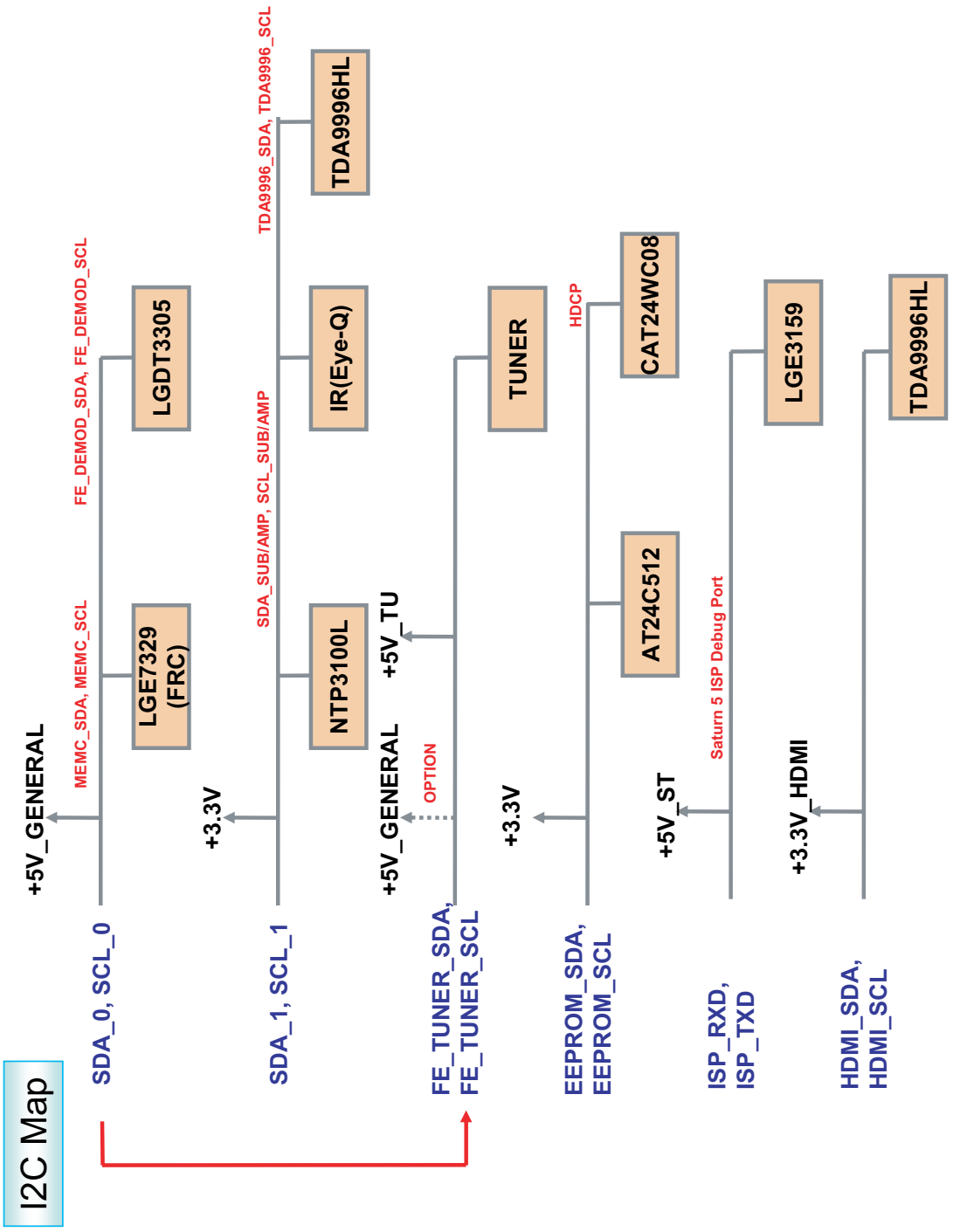




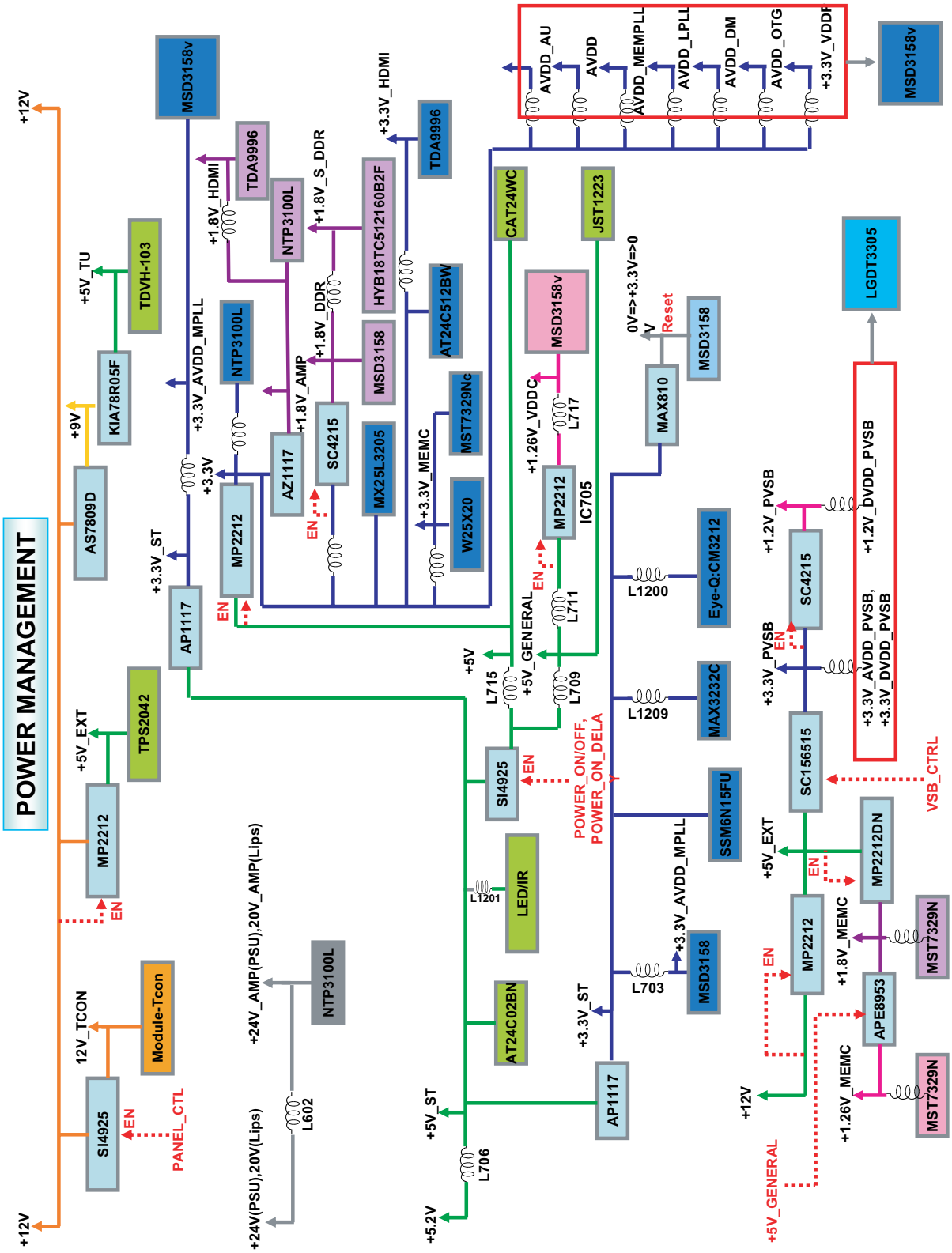
BLOCK DIAGRAM



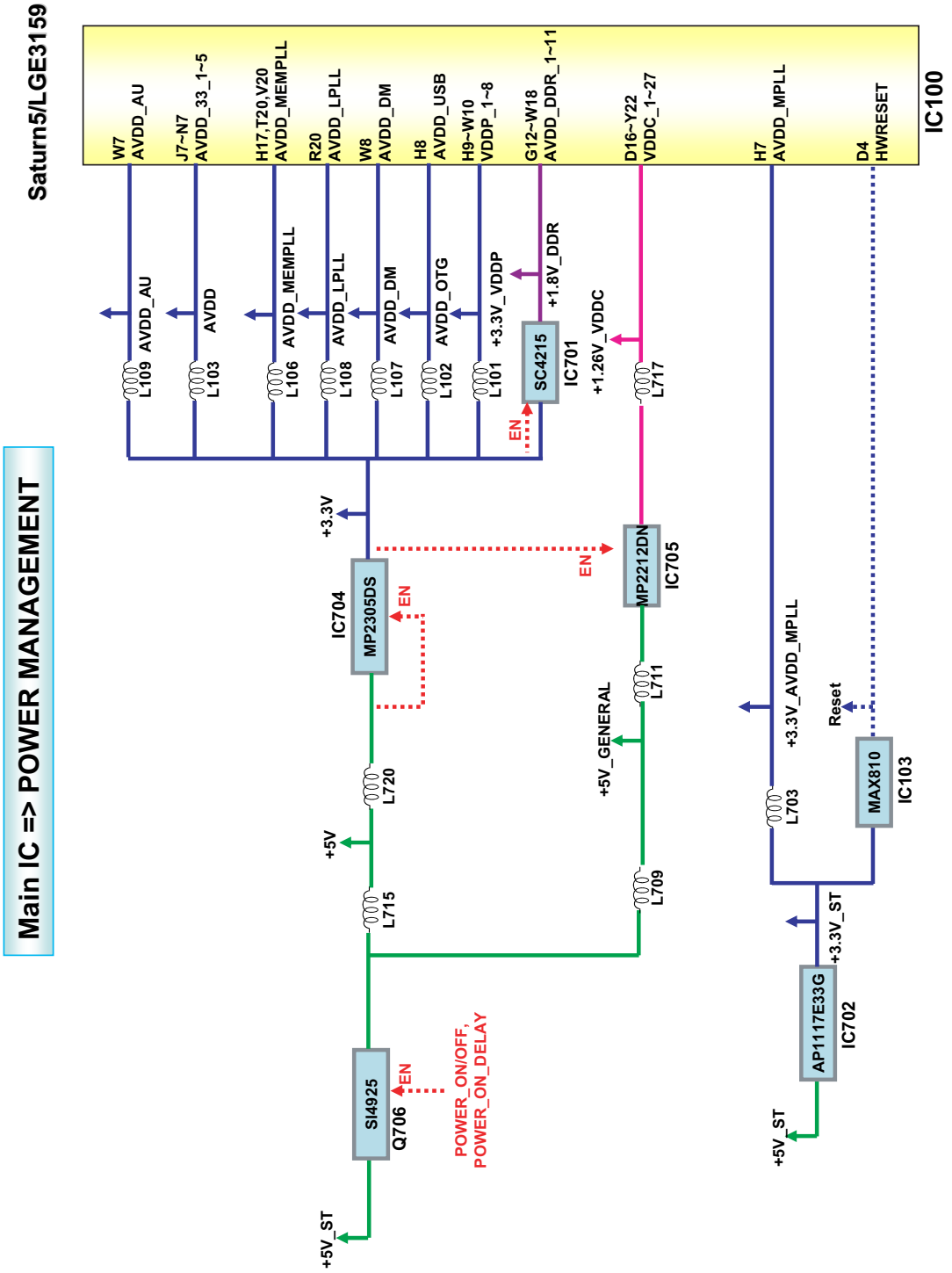
I2C Map



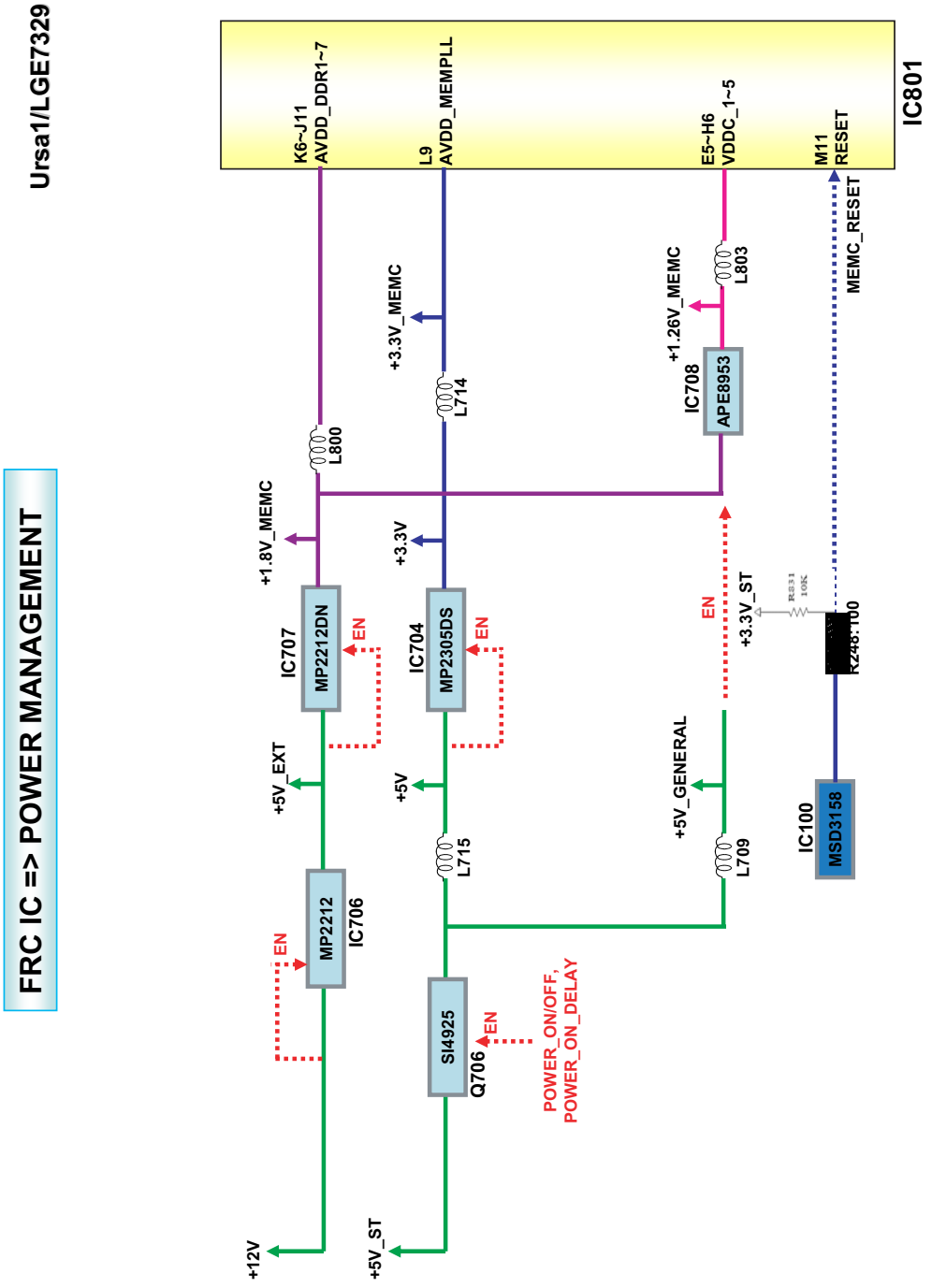
POWER MANAGEMENT



MAIN IC => POWER MANAGEMENT



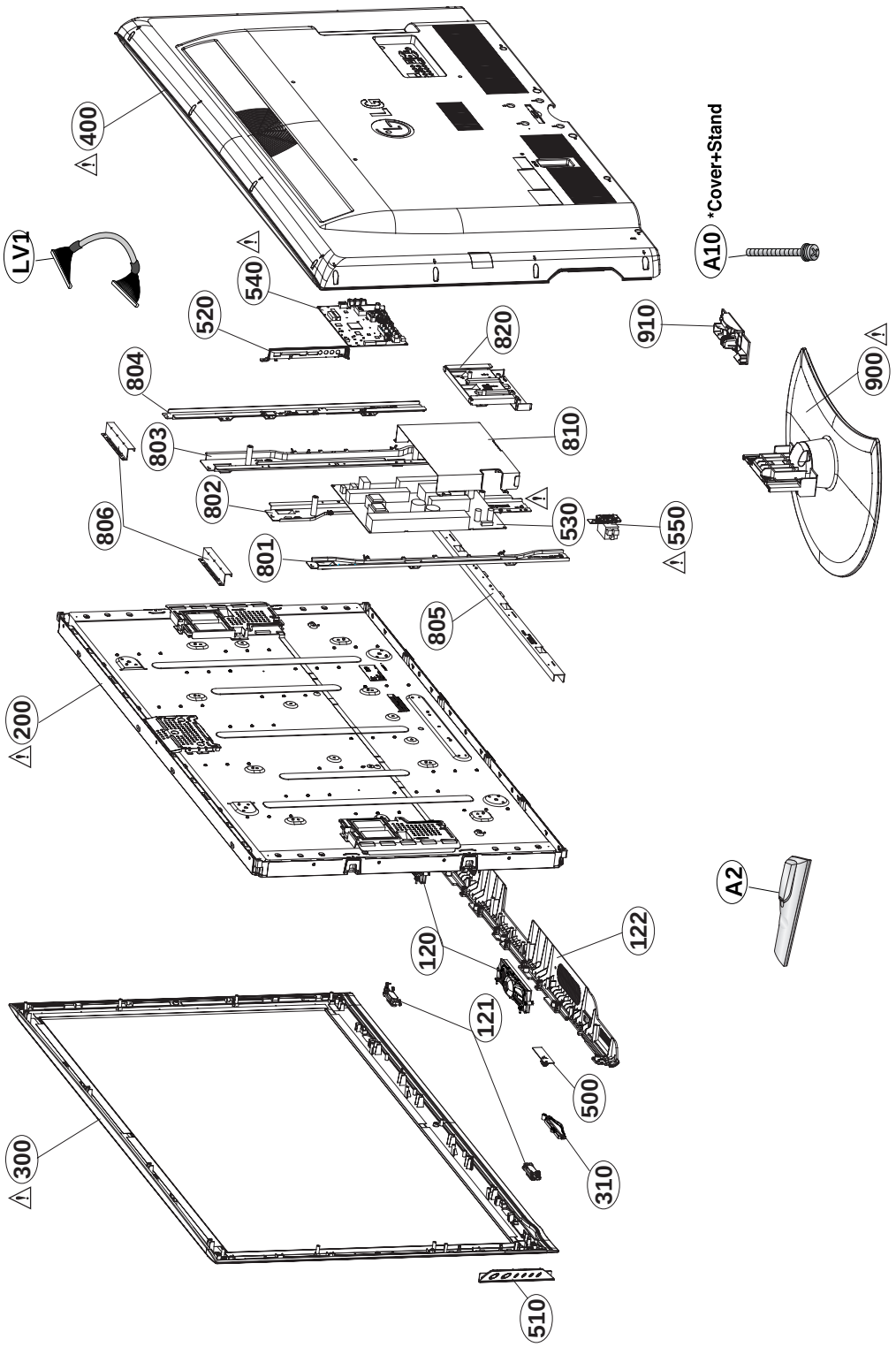
MAIN IC => POWER MANAGEMENT



EXPLODED VIEW

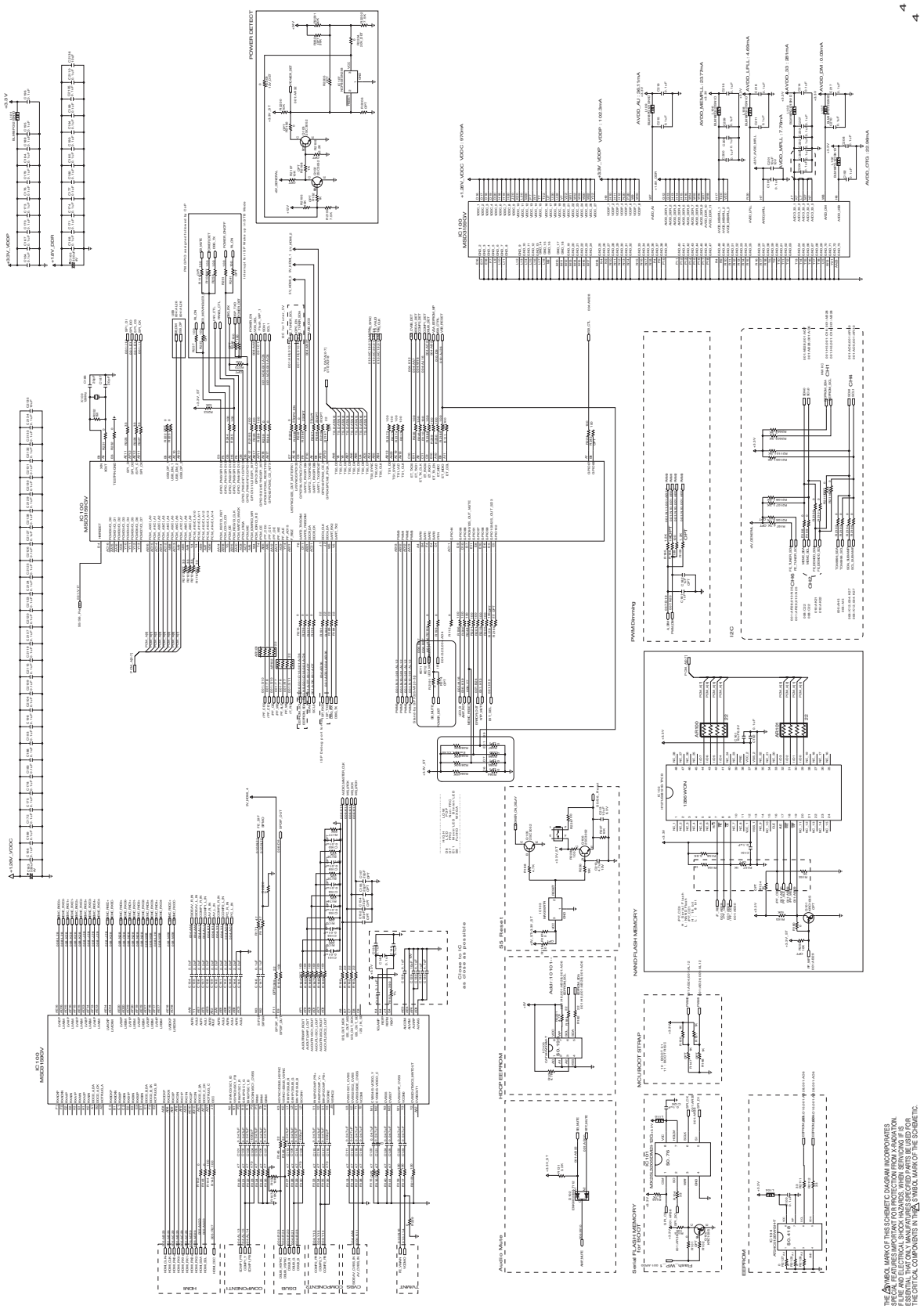
IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

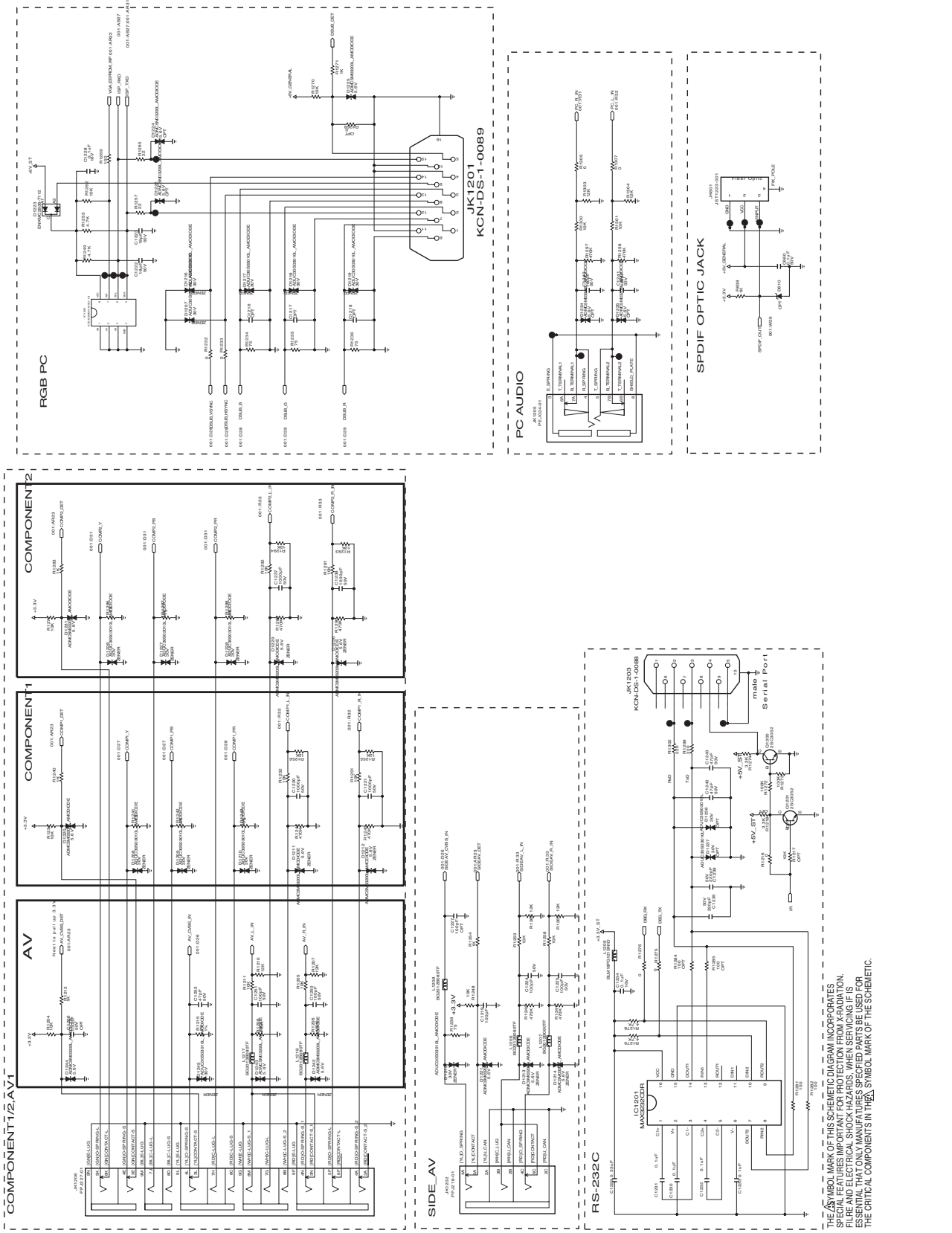


SCHEMATIC DIAGRAM

MAIN IC

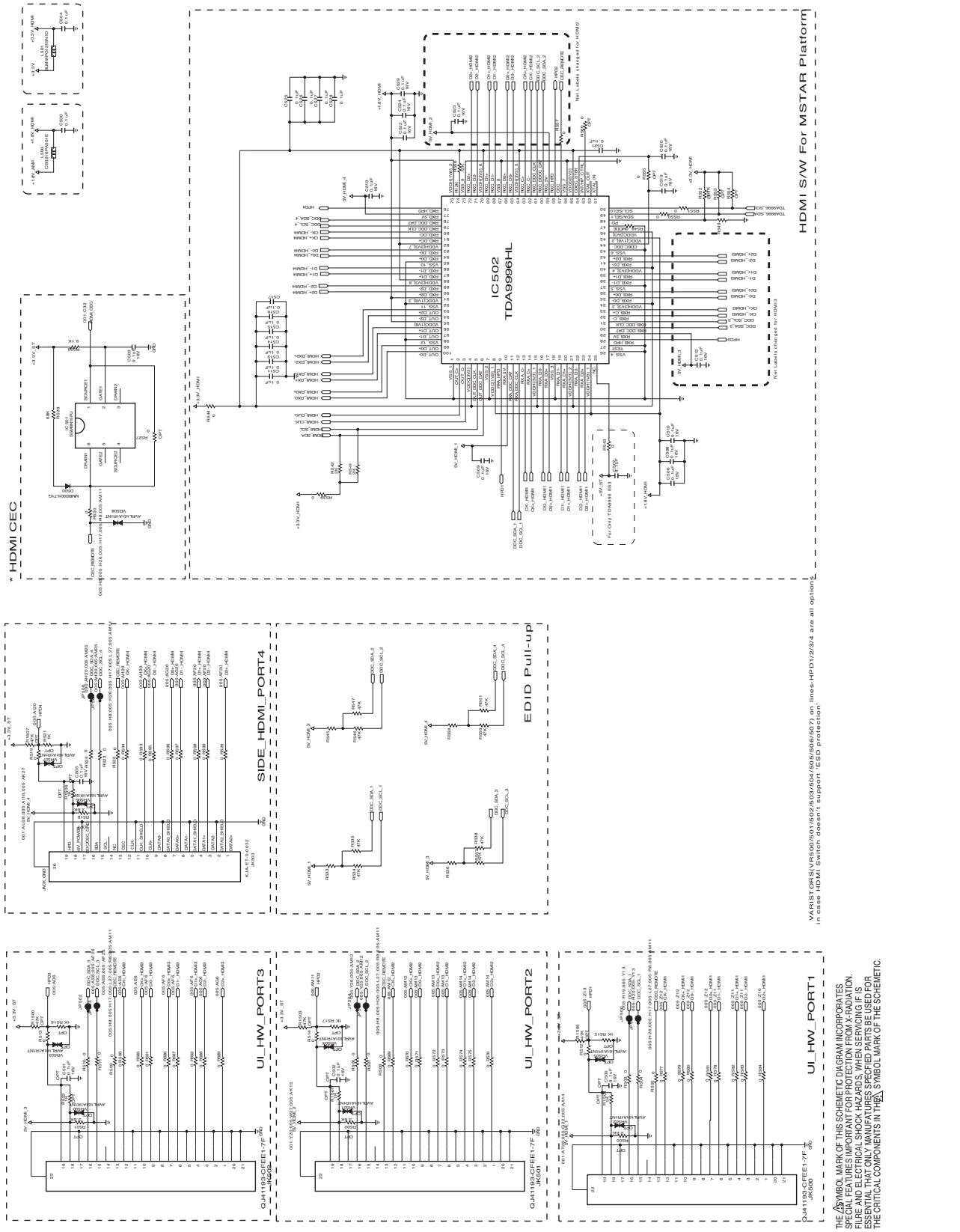


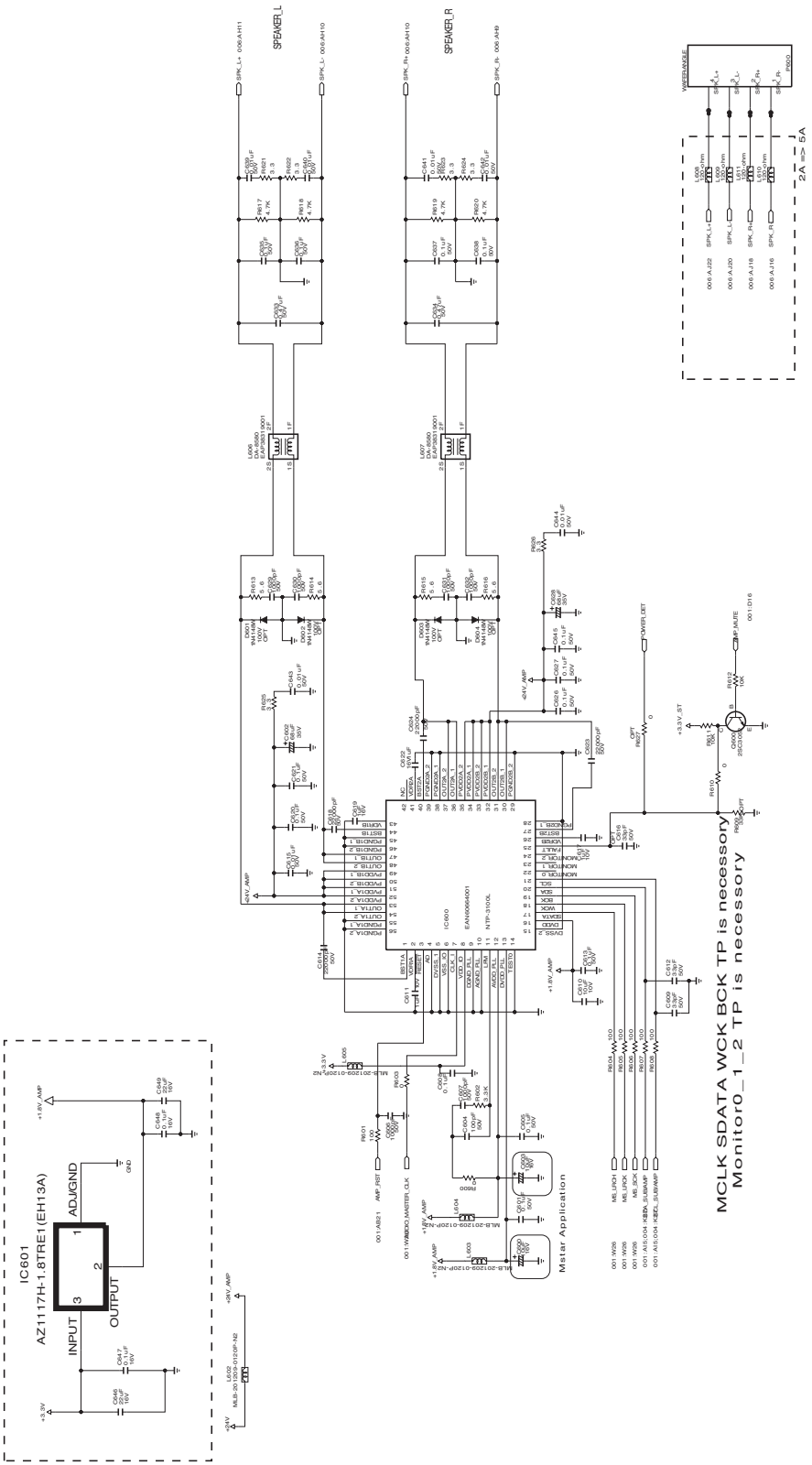
IN / OUT



THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FLIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFACTURER'S SPECIFIED PARTS BE USED FOR
THE CRITICAL COMPONENTS IN THIS ⚠ SYMBOL MARK OF THE SCHEMETIC.

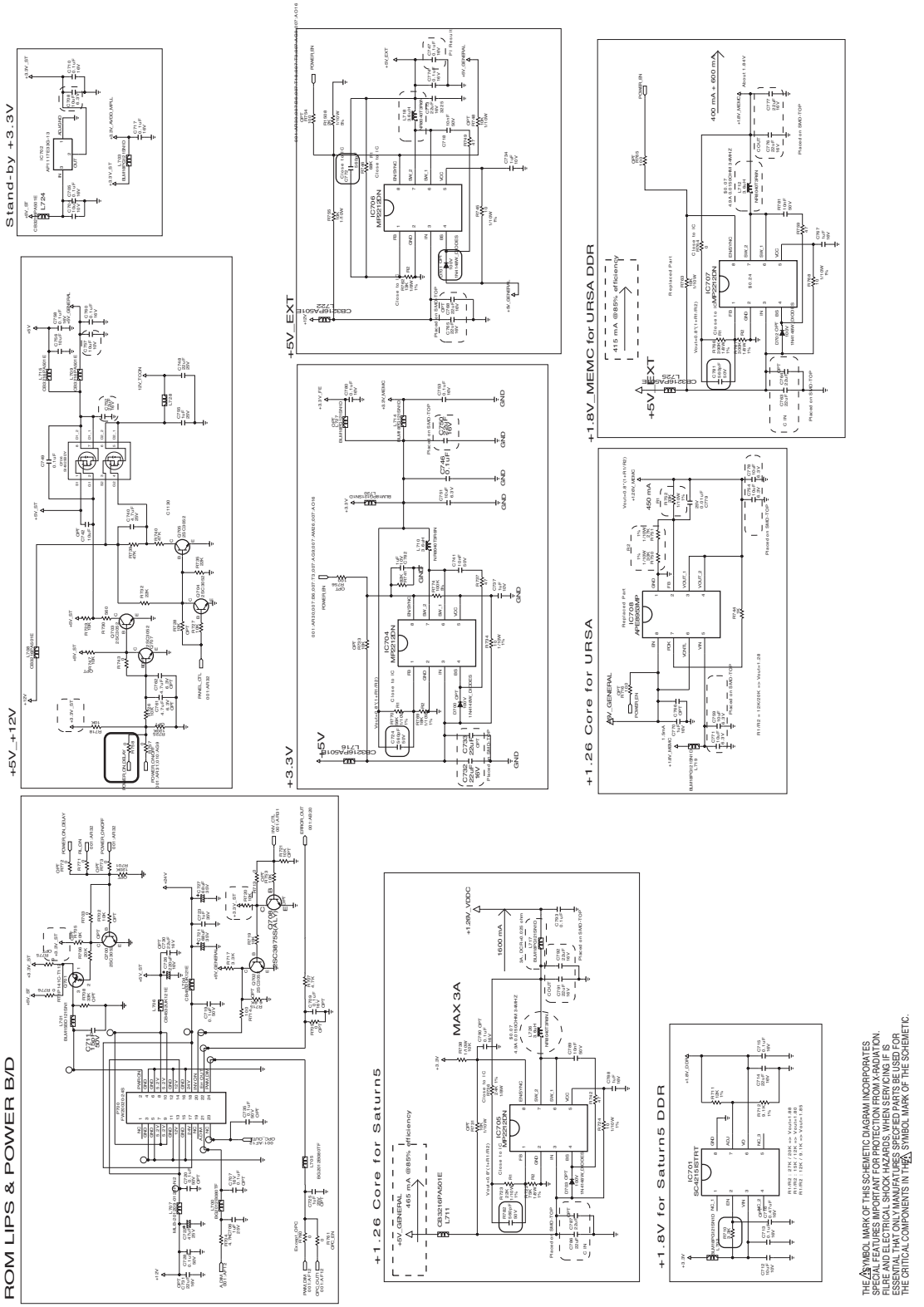
HDMI



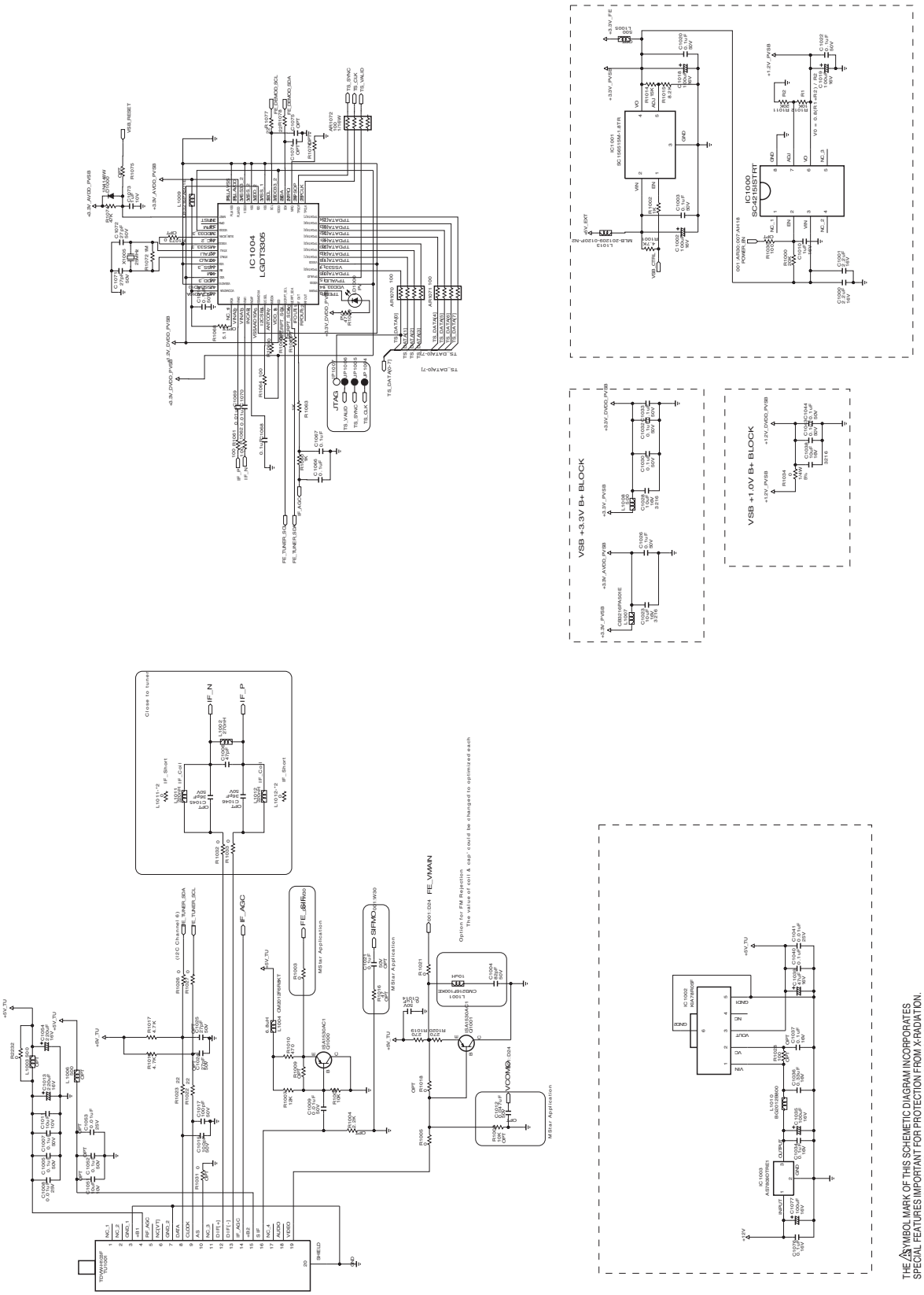


THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

POWER



TUNER



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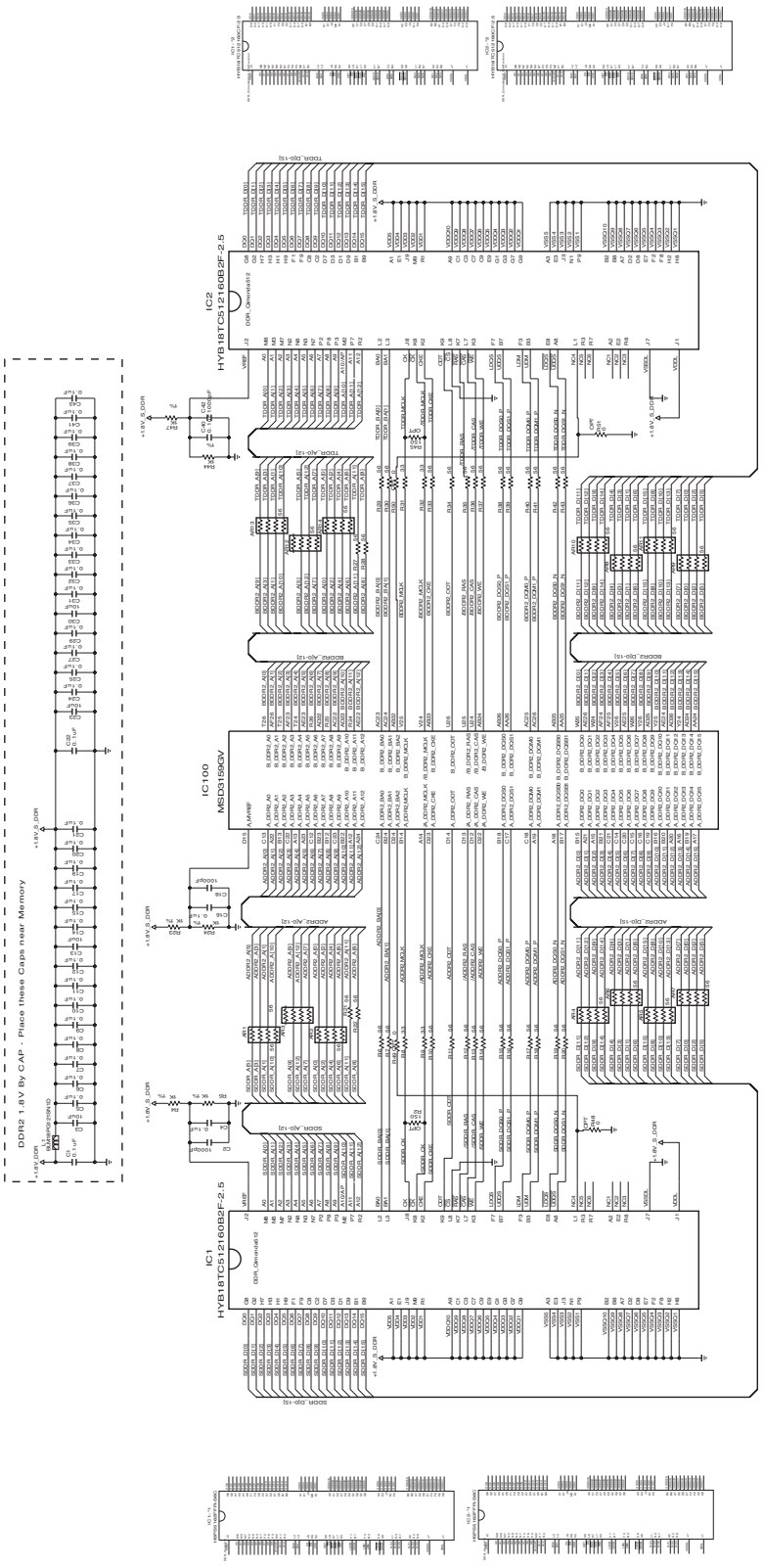
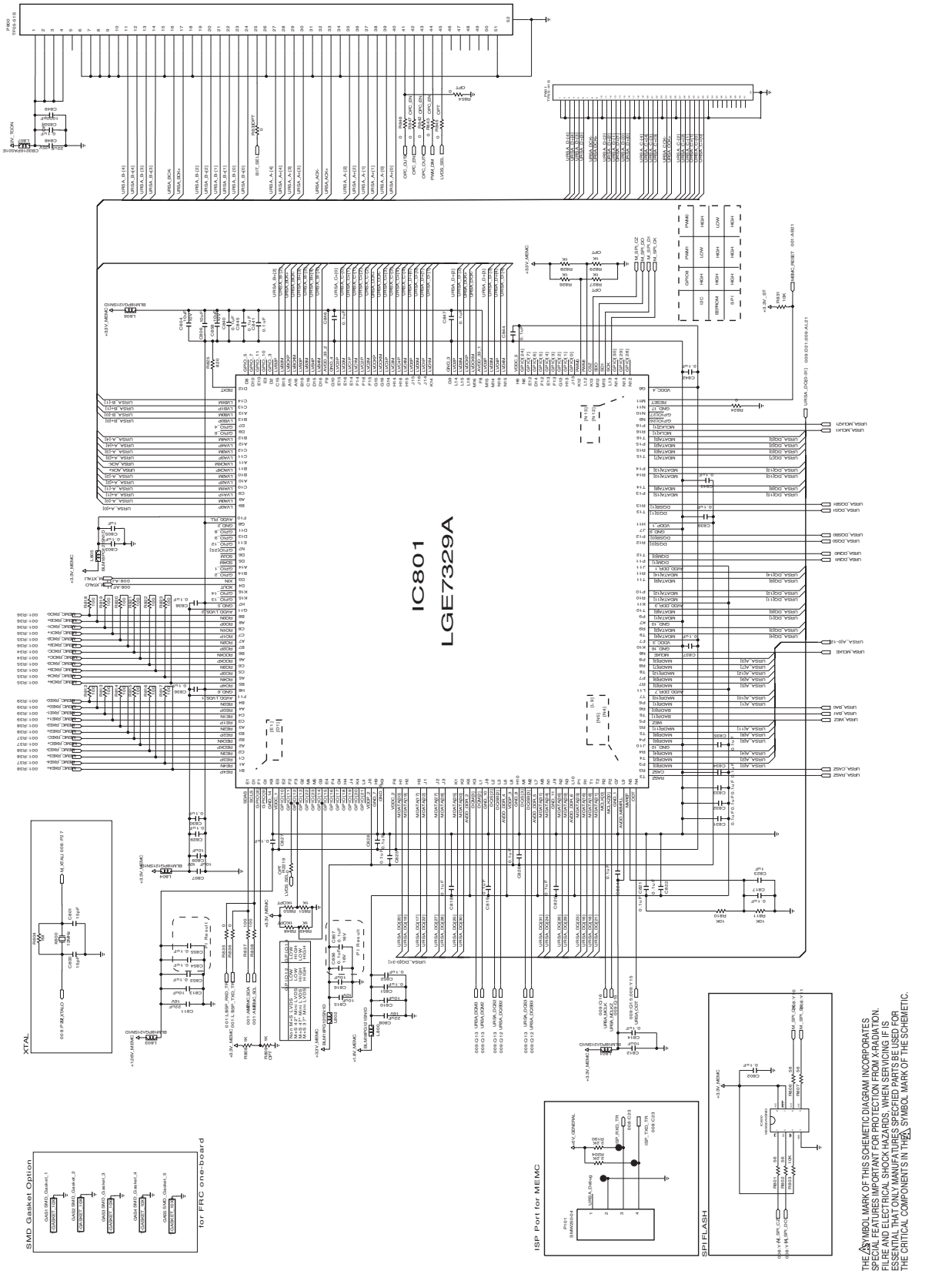
DDR2



THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RAY RADIATION.
FILE AND REPLACEMENT ONLY FOR SAFETY RELATED COMPONENTS IS
ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR
THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

LVDS/ FRC



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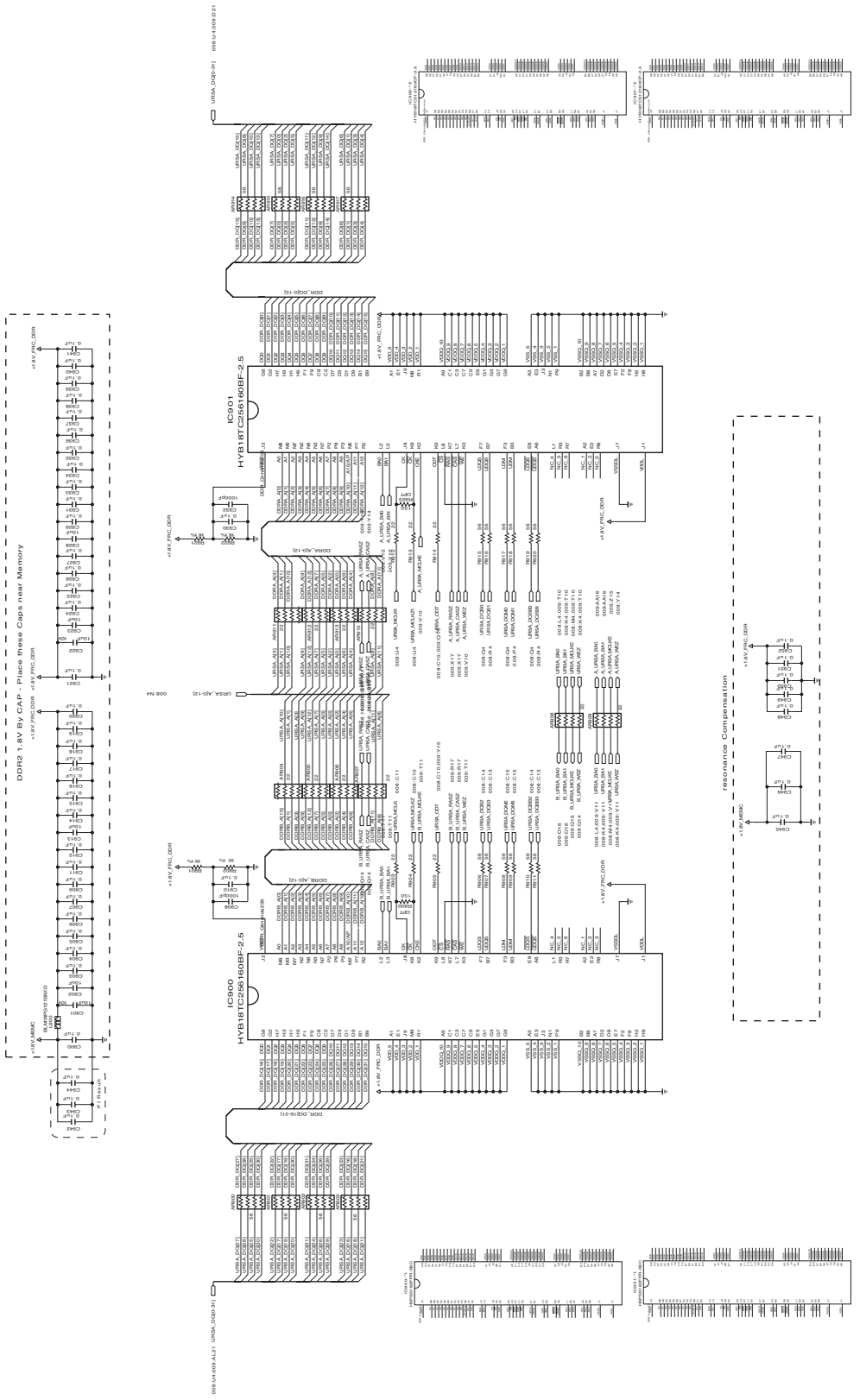
FRC DDR



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FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS
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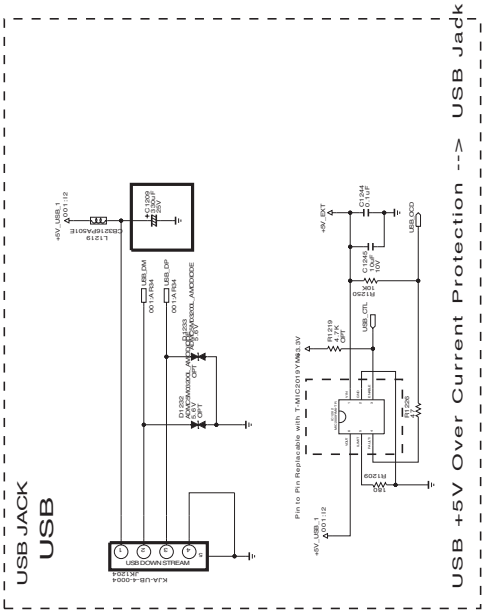
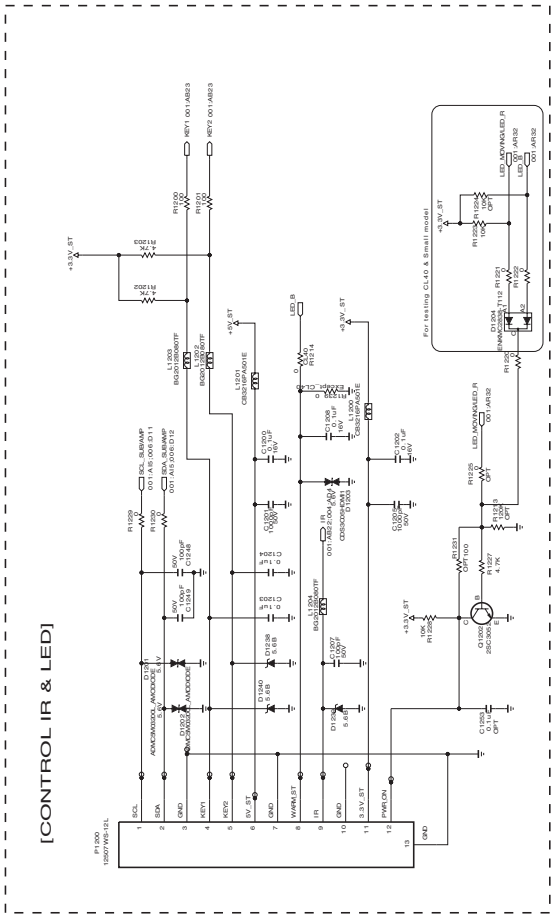
ETC SUB BOARD I /F





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LG Electronics Inc.

P/NO : MFL58436002

Feb., 2009
Printed in Korea